RAILROAD GAZETTE

FRIDAY, OCTOBER 18, 1895.

CONTENTS

Organization of the Administrative Force of a Railroad.*

Order is Heaven's first law! This is as true of human organization as of divine. Without order confusion follows, and inefficiency. The more complicated and extensive the organization the more essential is orderly method. This is the test to be applied to any method of organization. Does it secure for the end proposed the greatest efficiency at the least cost? With this test in mind, let us consider the principles essential to an efficient railroad organization.

A railroad corporation is divisible into two parts; that which it has in common with other corporations, and that which is peculiar to the operations of a railroad. To the corporate part belongs the corporate business of the company, as also its financial and legal affairs. It therefore includes the offices of the president, directors, secretary, treasurer, auditor and legal counsel. The railroad organization proper has to be considered with reference to the end for which the corporation has been formed; the transportation of persons and things by rail with safety and dispatch. To the extent that this purpose is attained the organization is efficient. In whatever respect that purpose is not attained, in that respect the organization is defective.

A fundamental requisite of an efficient organization is that there shall be a clearly defined division of responsibility among the several officials and employes who carry on the operations for which it is formed. This division of responsibility naturally follows the line of separation between the duties to be performed. These duties in a railroad organization are readily separable into certain general departments, which may be briefly described as follows:

First, as relating to the roadway. Second, as relating to the vehicles passing over the roadway. Third, as relating to the persons and things transported in those vehicles. There are therefore three, and only three, grand divisions of railroad operation.

Colonel Haines then goes on to describe the main functions of each department. He notes that although fixed signals belong to the roadway department it is not for the roadway officials to determine the character of such signals. The line of division between the vehicle department and the transportation department should be at the engine house. In the three departments named, the traffic department is not included. It has no proper sphere of action so far as the railroad is concerned. It might be absorbed into the corporate management without detriment to the safe and prompt transportation of persons and things, and very probably to the advantage of the corporation. The purchase, storage and distribution of materials is also a department somewhat by itself. Purchasing belongs to the corporate management; care and distribution to the railroad management proper.

Track sections should be long enough to employ a gang sufficient to handle a rail or a hand car, and short enough to allow the foreman to inspect the entire section every day on a velocipede and still look after his gang. A roadmaster or supervisor generally should have not over 100 miles of track. There should be a competent engineer to inspect bridges independent of the roadmaster. Shop buildings and engine houses should be under the care of the roadway department, as well as other buildings. The locomotive and car department should not control the employment of enginemen, firemen, wipers or car cleaners nor the storage and issuing of fuel for the locomotives. The principal repairs or reconstruction of rolling stock should be concentrated at one shop.

Next in order is the transportation department. The head of this department should control all the instrumentalities essential to transportation from the time that a person or thing comes under the care of the corporation until it passes out of it. Such a control would cover all responsibility in that connection not already assigned to the roadway and machinery departments, and would exclude the making of tariffs, the solicitation of business, the collection of revenue, and the purchasing of materials and supplies. . . . The superintendent of transportation should be assisted by a chief in each branch of service—a chief of station service and a chief of train service. Under the former should be placed station masters and agents with their subordinate clerks, porters and laborers and yard masters with their switching crews, while the latter should control the trainmen, telegraph operators and signal men. Such a classification clearly defines the responsibility for each kind of service. Separate conditions, of course, should be made for conducting other service incidental to transportation, but which is neither station nor train service.

It is not so easy to define the lines of division between the traffic and the transportation departments; still they impinge on each other at but few points. A ticket seller in a station building holds a divided allegiance, but one in a city office does not. In fact, so far as the station ticket office is a bureau of information it belongs to the transportation department proper. . . .

There is a broader view to be taken of railroad organization where the service is extended over a long line or over many branches. Here the responsibility must not only be divided by departments but also by territorial districts or divisions.

The main issue to be determined is whether the departmental responsibility shall continue through directly to the head of the department regardless of the territorial division, or whether it shall be concentrated in each of these divisions before reaching the head of each department. The same question has been agitated as to army organization; that is, whether a division or army corps should be treated as a unit in itself or as part of a great unit, the army. . . . That for which a man is to be held responsible that he should control and all the instrumentalities essential to that control. It would seem best to give free rein to a division superintendent up *to* that point where it is essential to the welfare of the transporation system as a whole, that his course should be brought in accord with the course of other officials outside of his sphere of action. His sphere of action is his division of the road, and within that division there should be no divided authority covering the transportation of persons or things with safety and dispatch . . .

Shall the division superintendent be entirely relieved from responsibility as to the condition of track or equipment? This question is in some respects answered by asking another. Will the efficiency of the service be diminished in any way if he be so relieved?

All railroad operations may be considered in one of two ways, either theoretically or practically. Territorially, these points of view coincide in the position occupied by the division superintendent. Now, shall there also be for each territorial division a division superintendent of roadway and one of equipment, respectively reporting to the chief engineer and to the mechanical superintendent? Or will not this multiplication of offices and the attendant division of responsibility be avoided by extending the authority of the division superintendent of transportation to some extent over the operation of the machinery and roadway departments within the limits of his division? Plainly it will, if that authority be not extended beyond the limit of efficiency.

My own experience leads me to believe that the ordinary roadway forces can very well be subjected to the authority of the Division Superintendent; that the latter should conform to the regulations established by the chief engineer as to standards, but that the care of important structures should be directly under the chief engineer. The selection of frogs and switches and the responsibility for track supplies should also rest with the Chief Engineer, who should issue them on the requisition of the Division Superintendent, so that the use of all kinds of material of different sizes and dimensions may be prevented and standards be preserved. The effect of this policy would be that the Division Superintendent would represent the Chief Engineer on his division just as he did the General Superintendent of Transportation, except in those matters requiring special technical training.

The same policy may be pursued with reference to the mechanical department, though perhaps in a different way A Division Superintendent can get over his own division much oftener than the Mechanical Superintendent can be expected to go, and if he be permitted to exercise a certain degree of supervision over the shops in a practical way, he can form a pretty good opinion as to how the work is going on and to what particular work preference should be given. A good deal of work for the roadway department is done in these division shops, and here it is well that there should be no division of responsibility as to neglect or delay.

The conclusion to which this reasoning brings us is that within the territorial authority of a division superintendent all railroad operations should be under his supervision, except as to regulations, standards, important purchases and the inspection of important structure. The threads of authority thus gathered together in his hands should from that point tend to the three department heads, the chief engineer, the mechanical superintendent and the general superintendent of transportation, to be again brought together in the general manager's office.

There are three men who make or mar the reputation of a railroad company with its patrons: the passenger train conductor, the station agent and the division superintendent. Within the scope of his authority each of them should be put in a position to determine definitely and promptly any matter that may be referred to him from persons having business with him. Further reference to distant superior authority leads to delay and dissatisfaction with the railroad company. With proper rules and regulations it is practicable to enable either a conductor or an agent to say yes or no promptly to any question that may be asked of him in the line of his duty.

The relations of the division superintendent to the public are of a different character. To the people having business with the road he is the embodiment of the corporation. When they want anything they go to him for it, and if it is evident to them that he can answer nothing definitely, that matters of routine have to be referred to a distance for the endorsement of some superior official before a definite answer can be given, they not only chafe at the delay but they feel that an adverse decision is due to the fact that they have not been heard, that they have not had their day in court. For these reasons, therefore, the division superintendent should be entrusted with very considerable discretionary powers in dealing with the people among whom he lives and with whom he is in daily communication. Where this is done they feel that their interests are considered by the railroad management. Where it is not done they repeat the trite sayings about corporations having no souls, and about gigantic monopolies, and are the ready prey of designing demagogues.

By all means then the division superintendent should be held up to the public as the immediate authority in all matters of ordinary interest to them and should be invested with power corresponding to that position. It is a mistake to make of him nothing more than a chief of train service, a mere link in an endless chain of officials propelled by motive power a thousand miles away.

*Extracts from the address of Colonel H. S. Haines, President of the American Railway Association, at the meeting of that Association in New York City, Oct. 16, 1895.

The Superintendents' Meeting.

The annual meeting of the American Society of Railroad Superintendents was held at Hotel Brunswick, New York City, on Monday of this week, about 25 members being present. The President, Mr. Beach, opened the meeting in a few words, speaking of the satisfactory progress which the Society had made and of the special points of interest to be taken up this year, among which is the application of electricity to railroad working. This gave him an opportunity to introduce

MR. H. G. Prout, editor of the *Railroad Gazette*, who made a short address on the use of electricity as a motive power on railroads now operated by steam. The scheme of his talk was to lay down some of the governing principles which would determine where electricity could and where it could not be used; the upshot being that for main line work, as ordinarily understood, it is not to be used; for city work it must be used, and that suburban work and interurban work are a debatable ground where electricity or steam may be used according to local conditions. He then gave some idea of the seriousness of electrical competition already and the gravity of the situation which is before the railroad companies now in the matter of suburban and interurban traffic, a good deal of which must inevitably go to the electric railroads in spite of anything that the steam railroads can do. It was suggested, however, that there are some steps which can be taken by some of the railroads which may postpone the loss of business to competing electric roads. Some railroads, for instance, may be able to equip two tracks for electric operation in their suburban zones on which very frequent and light trains can be run, stopping often. Semi-express trains to serve the more distant suburban points could perhaps be interpolated on these tracks. There are other railroads which may be able to acquire new lines and equip them for electric operation. A great many others can hope to postpone for a little while the loss of traffic by better suburban service, and perhaps lower rates. It was suggested that on some roads matters could be made more comfortable for passengers by better lights, better heating, better cars generally, better facilities at terminal stations, more trains and a quicker schedule. One way of accelerating the speed of suburban trains, which make frequent stops, would be to insist on greater promptness on the part of trainmen and passengers in getting away from local stations. This is largely a matter of education on both sides—education of trainmen and education of passengers. But after all is done there is a good deal of suburban and interurban business that cannot be saved.

There is, however, a set of conditions at work which will change the situation of the present electric railroads a good deal before very long. Up to the present time it has been easy to finance them and still is, because rail mills and electrical manufacturers are glad to help float the bonds of new electric railroad projects; the public is credulous and investors look for great profits. We are, therefore, in the midst of the kiting epoch of electric railroads, when bonds which are sold to-day pay the interest on the bonds sold last month or last year. But, naturally, this situation must come to an end before long. It will be hastened by the realization, now at hand, of the fact that more substantial construction must be used than was common in the earlier tracks, that maintenance charges are heavier than has ever been anticipated, that the accident expenses are more than promoters and investors have ever counted on, and finally, in some states, by the fact that right of way must be paid for. Furthermore, the states are beginning to exercise control over the building of new electrical railroads. All of these conditions are conspiring to put electrical railroad building on a rational basis and to approximate it more and more to the conditions of steam railroad building.

The report of the Executive Committee stated that Captain C. S. Gadsden, one of the earliest members of the Society, had resigned. The names of 20 new members were proposed and they were elected. The Treasurer reported as follows: Balance on hand at the beginning of the year, $1,647; received for dues and advertising, $1,585; total, $3,232; expenditures, $1,900, leaving a balance of $1,332 on hand. The Secretary reported the active membership as 215 and the honorary membership as six, to which the name of Mr. Waterman Stone, former Secretary of the Society and now a civil engineer in New York City, was added at this meeting. The Secretary presented a brief review of his work for six years, during which time he has taken in nearly $10,000 for advertising in the Proceedings of the Society. This work involved a large amount of correspondence. Four members have died during the year, including Captain R. G. Fleming.

The Secretary made several suggestions looking to the improvement of the Association, which were subsequently discussed by the meeting. The most practical points brought out in the discussion were that the meeting ought to be held at some time between April and October, instead of at a time so near the meeting of the American Railway Association; that the committee reports should be prepared a month before the meeting, so as to be sent to members in printed form; that local societies of superintendents could not very well affiliate with this Society, because they are organizations of companies and not of individuals; but that the individuals of those societies ought to be in some way drawn into the larger body. One General Manager at this meeting said that if the date had been September instead of October he should have sent a large delegation of his subordinates.

The Committee on Machinery, of which Mr. W. F. Potter is Chairman, presented a report on economies in locomotive service. Superintendents should demand and insist on having locomotives well adapted to the work they have to do. Loading trains on a tonnage basis is an important improvement. On one division of

the Pennsylvania Lines the train mileage was by this means reduced one-seventh. On the Union Pacific there was a saving of two cars per train. The speaker referred to the paper on this subject by Mr. M. W. Mansfield, which was published in the *Railroad Gazette* of July 12, 1895. The report next discussed premiums to engineers and firemen for saving fuel. In the month of July, on one division of the Pennsylvania Lines, $1,950 was paid to the men on this account, and one crew earned $15.50. The committee believed that similar methods should be adopted with oil and waste. On the Fall Brook Railway a marked saving of oil has been effected, although no premiums were paid. In 1893 the enginemen were told that a definite quantity of oil would be allowed to them, and during 11 months of that year a record was kept. A portion of the men used $243 worth more than the allowance, but others used $954 worth less than the allowance. On the Flint & Pere Marquette the number of miles run per pint of oil, which averaged 21.27 in 1893, was increased to 30.34 the next year and to 35.17 in 1895. One engineer, who used a pint of oil to every 24.75 miles in 1891, ran 67.92 miles to a pint in 1894. Another one increased his mileage from 16 52 to 51.00. In two cases the increase in mileage to a pint of valve oil was from 55 to 233 and 35 to 266. Records were also kept in the car department; the number of freight car miles to a pint of oil in 1893 was 138, the next year it was 165 and this year, so far, 208; passenger cars, 79 miles in 1893, 94 miles last year and 99 miles this year. It is necessary, of course, to take care that the men do not become excessively zealous and use too little oil.

The committee holds that the "chain-gang," in spite of its drawbacks, is the only right method of handling freight engines when business is heavy. This plan necessitates efficient roundhouse inspectors. Mention was made of the successful use of the piece-work method in paying such inspectors. The report referred to the value of lap sidings for facilitating freight movement and to the fallacious theory, practiced on some roads, that locomotives should be run as long as possible before being sent to the shop. Engines thus run often cause loss by their inefficiency.

The report of the Committee on Transportation was read by Mr. T. F. Whittelsey. The Committee did not discuss the Standard Code for the reason that it is in course of revision by the American Railway Association. Inquiries had been made as to loading freight trains by tonnage, and in every case it was reported successful, the saving being from 7 to 10 per cent., on roads hauling mostly heavy freight, and 13 to 17 per cent. on lines where the movement was miscellaneous. One Superintendent reported that in the active cotton shipping season he increased his average train load 25 per cent., and for 12 months he figured a decrease of 23 per cent. in the average time taken by freight trains to run over the road.

The committee on the relations of railroad companies with their employees, of which Mr. C. R. Fitch is Chairman, presented an exceedingly sensible report, which we print in another column. This report, which ended the morning session, touched upon the value of the work of the Young Men's Christian Association among railroad men, and at the opening of the afternoon session President Beach, who has had long experience in this work in New England, commented upon the report, giving instances of good results which he had observed during the last 25 years. The good moral effect of religious men among the forces on his division, is constantly visible.

The next thing was a paper on Economies in Track Work by Mr. A. Morrison, Roadmaster on the Lehigh Valley, which we expect to publish next week. Following this came a series of desultory discussions on the topics named in the call for the meeting. On the subject of handling fast freight trains it was pointed out that dispatchers are often reluctant to hold passenger trains to facilitate freight movement when it could just as well be done without injuriously delaying the passenger trains. Mr. Wattson told of the method used on the West Shore, which was the first road to run a 56-hour freight train from New York to Chicago. For these trains the car inspector takes pains to select good cars and tries to get air-brake cars. The freight agent sees that the trains are not loaded down with low class freight to the detriment of high class. The best crews are selected to run these trains. To save time and labor in telegraphing, cars are recorded by "lots," so that at division terminals a lot of cars for the same destination can be reported under a single number. In case a car has to be left for repairs then it is taken up by its individual number and is subsequently restored to another lot in the next fast freight train. On freight coming from the New England Railroad, the West Shore uses the Odell system; every car is reported by telegraph to Boston, where a series of blocks, constituting a miniature train, is made up according to the telegrams, and is moved along a board as the train progresses toward its destination.

The question, How far can the M. W. department be placed under the Superintendent, brought out various bits of testimony as to the friction and delay produced by not having all departments on a division under the Superintendent of that division. A Superintendent was told of who could not get a leaky engine exchanged for a good one, but had to put it in the house and do without an engine for a time. Where the car department had exclusive control of the oil used by freight conductors the supply in the cabooses was very wastefully used.

Col W. H. Stevenson, who was President of the Society in 1887, and has since held various offices above the grade of Superintendent, said that not only the maintenance of way, but all the work on a division should be under the full control of the Division Superintendent. Give that officer supreme control, hold him responsible for results, and you have the ideal plan. The Colonel's remarks elicited loud applause.

The question, shall we abandon all effort to obtain a night position signal, was answered with an emphatic yes by Mr. Wattson, Mr. Moodey and others. The speakers on this side of the question had been unable, after patient search, to find any case of disaster from a broken red glass; but Mr. Potter at once cited several instances, in one of which a superintendent, a member of this Association, had been injured in a derailment from this cause, so that he lay unconscious for six hours.

On the subject of discipline without suspensions there was an animated discussion. Those who doubted the expediency of abandoning the practice of suspending men for offenses, enlarged upon the importance of following the Scriptures, which tell us not to spare the rod; but Mr. Ketcham, of the West Shore, whose remarks on discipline were very sensible, called attention to the fact that we should also follow the Scriptures in another respect, to wit, in being careful to do unto men as you would that men should do unto you. Mr. Ketcham requires candidates for positions on freight trains to ride over the road with a freight conductor two weeks before they receive an examination. He finds it profitable to get conductors and enginemen together and discuss incipient evils, little things which have not yet become of enough consequence to call for punishment.

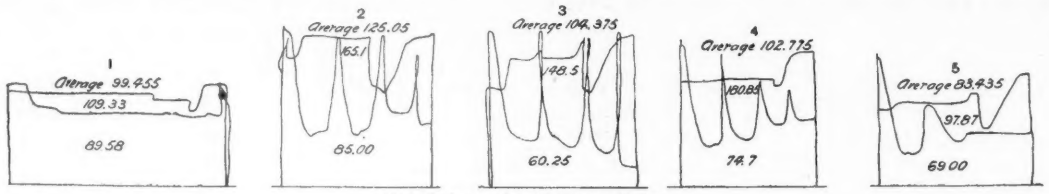
Mr. Sully, taking a lesson from army discipline, said a man should never be discharged except by the verdict of a board of two or three men. A discharge often practically blacklists a man, and he (the speaker), for one, did not wish to take the sole responsibility of thus deciding a man's fate.

Mr. C. A. Wilson, of the Wheeling & Lake Erie, who abandonded suspensions about a year ago, advocated fines, but it appears that he limits this term to the payments which men are required to make when they lose a switch key, send a useless telegram, etc. On his road serious discipline is administered by a board, not by a single officer, and this board meets once a month. All his men like the new plan. The bulletins are a valuable means of instruction to the men. It had been claimed that the abolition of suspensions, however successful on the road, would be too mild a measure for yard men, but he had found it just as good in dealing with the latter as anywhere else. Asked to what extent the cost of damages to cars, etc., had been reduced, the speaker could not reply definitely, but estimated 50 per cent. A valuable result of the new system is that men now comply with the last clause of Rule 4, standard code. The men understand that in reporting derelictions of others their communications will always be treated as confidential. The criticism was made that this system "encouraging a man to bank on his good record," would encourage carelessness, but all those who have tried it scouted this argument and reiterated their hearty approval of the system. Mr. Whittelsey (T. & O. C.) being asked if he had made no suspensions whatever during the past year replied that he had; he had suspended collisions entirely.

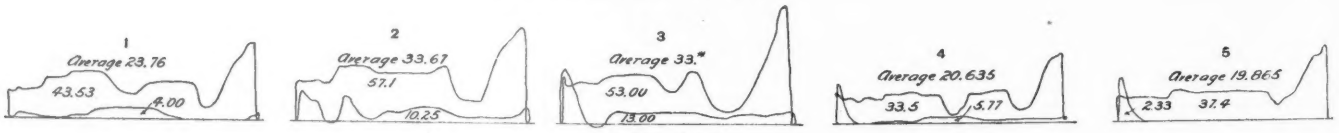
Mr. G. R. Brown (Fall Brook Ry.), who has had 12 years' experience with this plan, who is in fact looked upon as the father of the scheme, confirmed the opinions of those who had adopted it more recently. His methods are now in use on the Wheeling & Lake Erie; Toledo & Ohio Central; Toledo, St. Louis & Kansas City; Pittsburgh, Cincinnati, Chicago & St. Louis (one division); Chicago & North Western (one division); Louisville & Nashville (one division) and on the Chicago & Alton throughout.

The election of officers resulted as follows: President, C. B. Price, Allegheny Valley; First Vice-President W. F. Potter, Flint & Pere Marquette; Second Vice-President, Seely Dunn, Louisville & Nashville. Secretary Hammond and Treasurer Sully were re elected.

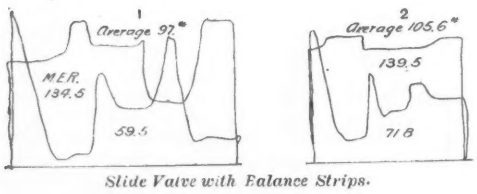
The suggestions of the Secretary looking to the reorganization of the Society, especially as regards federating with local bodies, were referred to the Executive Committee, as was also the selection of the time and place for the next meeting.



Slide Valve without Balance Strips.



Piston Valve.



Slide Valve with Balance Strips.

Comparative Tests of Slide and Piston Valves—Northern Pacific Traction Tests.

Friction.

Traction Tests on the Northern Pacific.

[WITH AN INSET.]

The account which follows of certain valuable tests of train resistance and locomotive pull, together with the drawings, was furnished to us by Mr. E. H. McHenry, Chief Engineer and one of the Receivers of the Northern Pacific. The profile, which includes a section between Glendive, Mont., and Dickinson, N. D., 106 miles, shows for this section results similar to those obtained during a recent trip made over the entire line of the Northern Pacific Railroad, from Tacoma to St. Paul and return, for the purpose of determining grade and rolling resistances at all speeds, horse power developed, ratio of adhesion, effective tractive power of engines of various classes, indicated horse power, and net effective horse power. The profile shows both east and westbound trips. The dotted line is the speed line, the unbroken line the traction line, and the dash and dot line the horse power line. The results were obtained with a dynamometer car.

On the eastbound trip from Glendive to Dickinson, made June 22 and 23, a class F consolidation engine was used, with 96,000 lbs. on drivers, and a total weight, with tender, of 185,500 lbs. There were 24 cars, including a caboose, a special and the test car. Their gross weight was 625 tons, the tare 335 tons and the net weight 289 tons.

On the westbound trip from Dickinson to Glendive, made July 5, a similar engine was used, and the train consisted of 27 cars, including test car and Superintendent's car. The weight of the train was about 536 tons; the tare, 374 tons, and the net weight, 162 tons. In addition to the results shown on the profile, the engines were "indicated" at all numbered points where time is given on the speed profile, and both water and coal consumption were carefully ascertained.

The sum of the rolling and grade resistances per ton can be determined, for any speed, by dividing the traction in pounds indicated by the line on the profile by the weight of the train in tons. The net effective horse power developed behind the engine can

be obtained at any point by multiplying together the traction in pounds, and the speed in miles per hour dividing by the constant 375, to which must be added for the weight of engine a percentage amount corresponding to the ratio between weight of train and weight of engine, in order to obtain the total effective horse-power developed. The indicator diagrams obtained at various points have been worked out, and by comparing the results, the lost power due to head resistance and the various cylinder and frictional losses has been determined. It is obvious if the speed and corresponding traction at different points are plotted on a sheet showing horse-power curves, the relative efficiency of the engine at different speeds may be obtained, as shown on the accompanying diagrams.

The diagram for engine 516, a class D-2 mogul, shows that the coal is burned to the best advantage at a speed of 20 miles per hour for this class of engine, the efficiency falling off both above and below this point. At the lower speeds, the reduced efficiency is evidently due to the fact that the steam has not been worked expansively. Above that point the reduced efficiency is probably due to wire drawing steam through the ports at high piston speeds. A diagram thus obtained for any engine, may obviously be used for rating the engine under any other conditions of load, speed and grade. For example, at the speed of 10 miles per hour engine 516 exerts a tractive power, excluding that required for moving its own weight, of 17,000 lbs., while at 30 miles per hour, it would be fully loaded in overcoming 6,250 lbs. resistance.

The diagram for engine 464, a class F consolidation, shows a decreasing efficiency with rising speed. An inspection of the profile shows this engine was much under-loaded, and the apparent falling off in efficiency was produced by "throttling" the steam.

It has long been the policy of the present General Manager, Mr. J. W. Kendrick, to reduce grades at points where it would result in increasing the train length, without incurring an unjustifiable expenditure. Very careful estimates and calculations have been prepared with this end in view, which show that an annual net saving in operating expenses of $500,000 may be effected by the expenditure of $1,500,000, thus realizing an interest on the investment of about 33%. It is not the intention to reduce grades exceeding the adopted maximum rate, unless the virtual or actual resistance exists in fact. In other words, grades of any rate do not limit train length, provided the total rise does not exceed the height over which the stored energy, represented by the momentum, or speed of the train, will carry the train—an interesting illustration of which is shown on the eastbound profile between miles 167-68, at which point the sharp but short summit fails to cause a pull on the drawbar. The reduction in speed shown by the speed profile sufficiently accounts for the power required to carry the train across the summit. An inspection of the profile showing the power required to start a train in motion from rest at mile post 174 (Beach Station), and at the water tank stop, mile post 191, shows the great difference in power required to start trains from sidings favorably or badly located.

This company has recently changed its method of rating engines to an actual tonnage rating, from the old system, under which a "load" was rated as equal to the full weight of car and marked capacity, and the results obtained by the recent test trip will be found invaluable in this connection. The tonnage ratings adopted on the majority of roads are usually based upon some ratio of adhesion to weight on drivers of engine, and neglect to provide for the speed factor, which is of equal importance.

On the profile the average resistance in pounds of the test train is marked for each section, and a proper schedule can readily be determined for each class of power by taking from diagram the speed corresponding to the intersection of the resistance line with the actual horse power developed by that class as determined in practice.

The dynamometer used is a very simple device, whereby the pull on the drawbar is directly transformed into fluid pressure, which actuates a gage and the recording mechanism. This device is the joint production of Mr. J. W. Kendrick, General Manager, Mr. E. H. McHenry and Mr. H. H. Warner, Master Mechanic, Tacoma, Wash. Results of another adaptation of this device, for determining slide valve friction, which was devised and applied by Mr. Warner, are shown in the accompanying diagrams, and also in the table given herewith. It develops the fact that there are unsuspected peculiarities in the friction of valves, and demonstrates that but a small part of the pressure is actually counter-balanced in the so-called balance valve. The diagrams of the resistance of piston valves are very favorable to that type.

SLIDE VALVE WITHOUT BALANCE STRIPS.

Number of card.	Speed.	Cut-off.	Steam chest pressure.	Average indicator pressure.	Dynamometer pressure with 3 in. rum.	Dynamometer pressure per one lb. of steam chest pressure.	Average power exerted per lb. of S. C. pressure including friction.	Power exerted per 150 lb. steam chest pressure including friction.	Power exerted less friction per 1 lb. steam chest pressure.	Per cent. not balanced.
1	9	19	50	99 455	7 5	14.1	.....			
2	15	15	70	125.65	853.9	12.3414	.....			
3	14	15	60	104 875	737.8	12 293				
4	10	15	50	102.775	729 5	14.53	.....			
5	15	15	40	83.435	588.8	14.72	.....	.....		
Av'g.	12.6	15.8	51	103.018	724.4	13.5	13.5	2,025	11.43	10

PISTON VALVE.

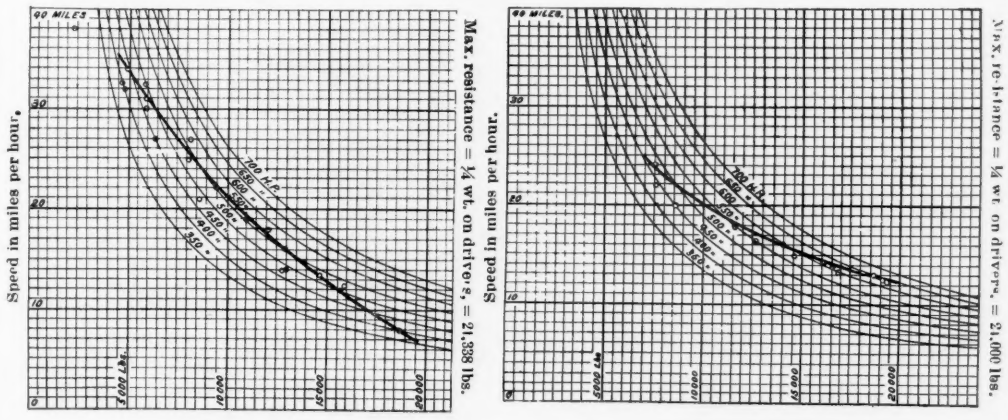
1	12	17⅛	95	23.76	166.9	1.76	.....	.....	.....	...
2	17	15⅝	115	32.67	238.0	2.07	.....	.....	.....	...
3	14	15⅝	110	33	233.2	2.12	.....	.....	.....	...
4	14	15⅝	70	20 635	145.8	2.08	.....	.....	.....	..
5	18	11¼	78	1 .865	140.4	1.8	.....	.....	.....	...
Av'g	15	15½	93 6	26.186	184.8	1.94	1.91	285	.83	7.2

FRICTION.

	27	14¼		15.155	107.1					

SLIDE VALE WITH BALANCE STRIPS.

1	20	19	100	97	685.6	6 85	.....	.....	....	..
2	14	15	80	105.6	746.4	9.45		.....	.....	....
Av'g.	17	17	90	101.3	715.5	8.15	8.15	1,222	6.53	57.1



Engine No. 516, Class D-2, from Mandan to Dickinson. *Engine No. 464, Class F, Consolidation, from Dickinson to Glendive.*

Horse-Power Curves—Northern Pacific Traction Tests.

Roadmasters' Association of America.

We gave last week, page 679, the general programme of the meeting of the Roadmasters' Association of America, held in St. Louis this week. We are unable to give this week any report of the meeting, but the committee reports of which we received advance copies follow.

LONG RAILS AND MITER JOINTS.

Your committee appointed to report on the advisability of increasing the length and using miter cut rails, submit the following:

Rails of a greater length than 30 ft. can be used with safety and economy. Experiments show that no objectionable feature has developed in the expansion and contraction of rails over 100 ft. in length, and actual experience from observation with the use of rails 45 and 60 ft. long confirms this. This being the case, there can be little doubt as to their safety.

The economy in the use of longer rails is in the reduction in the number of joints and their maintenance, which is a matter of simple calculation; less the additional cost of manufacturing, transporting and handling, which would vary on different roads in accordance with their distances from the point of manufacturing, and the methods of handling.

The additional increase in length, which we now think is within the limit where the reduced cost of maintenance would be balanced by the increased cost of making and handling is from 45 to 60 feet.

A few miter cut rails in use on some roads have failed by parting at the ends between the web and the head. We believe this trouble to be caused more on account of the particular form of the section or a mechanical defect in the manufacture, than on account of the miter cut. With these two objectionable features removed, we recommend the use of rails cut in this way.

Miter-cut rails can be used with safety as facing points when cut at an angle of 55 to 60 degrees to the axis of the rail. We would, however, favor their use as trailing points only for double track.

The strongest form of angle bar now made, supported on a tie and having not less than six bolts, will answer for miter-cut rails. In addition to this we would recommend the use of one or two stops on the center of the rail to more effectually prevent creeping.

Your committee are unable to give the difference in the life or the additional cost of miter-cut over square end rails.

R. Caffrey, John Doyle, B. Murtaugh, E. R. Waite, Committee.

HOLLOW TIRES.

Your committee appointed to prepare a paper on "Hollow Tires and the Injury Caused by the Same to Split Switches, Spring Rail and Rigid Frogs," submit the following:

. . . The damage to spring rail frogs from this cause consists mainly in battering and shearing off the wing and point. It is on this class of frogs that the greatest danger of derailment from hollow tires exists, for, in trailing the frog, the tendency of the hollow tire is to crowd the spring wing out; the gage is thereby widened and the result is derailment. Again, each time an engine with hollow tires crosses a spring frog, a severe blow is delivered to both the point and wing rail; this, when given to the spring wing, after a time causes it to become bent or strained, which retards the free and natural action of the spring, so that the spring wing cannot be depended upon to close properly after the switch is used, and here lurks danger of derailment, which, when traced to its primary cause, invariably points to the hollow tire. The swing given to a locomotive with hollow tires, when running over a frog, causes the gauge of both the track and guard rail to be affected, and the general line of the frog to become ruined, thereby necessitating frequent readjustment.

As a measure of safety, when hollow tires are allowed to run, the spring rail should be planed down where the tire first comes in contact with it; this will allow the wheel to mount the wing, without so great a chance of wing being crowded out, and the engine derailed. There should also be a flaring opening left at the point, so the flange would be started in before putting any pressure on the spring wing, thus relieving the guard rail.

The damage to rigid frogs by hollow tires is of the same nature as to spring frogs, but the danger of derailment is not nearly so great. The effect of hollow tires on split switches is about the same as on spring frogs, there being great danger of derailment when a locomotive with badly worn tires trails through. If these switches were never used by engines with bad tires, it would not be necessary to elevate the point above the stock rail; but, under existing circumstances, we think the point should be planed down so that it is not less than ¼ in. lower than the stock rail at the point and rising gradually until it is not less than ¼ in. higher than the stock rail at a joint were planing of head of switch rail ends.

We would recommend that the wear on tires be not allowed to exceed ⅛ in. on engines used on high speed trains and not to exceed ¼ inch on all other engines.

The following list shows the wear now allowed on a number of different roads:

Limit of Hollow Tires on Different Roads.

Names of roads.	Pass. engines.	Freight engines.	Switch engines.
	(Fractions of inch.)		
Illinois Central	¼	¼	¼
L. S & M. S	1/16	⅛	⅛
Michigan Central	1/16	1/16	1/16
C., B. & Q	¼	¼	¼
C. R. I. & P.	⅛	⅛	⅛
P. F. W. & C.	⅛	⅛	⅛
C. M. & St. P.	¼	¼	¼
C. & Alton	¼	¼	¼
N. Y. C. & H. R. R. R.	¼	¼	¼
West Shore	¼	¼	¼
L. N. A. & C.	¼	¼	¼
A. T. & S. F.	¼	¼	¼
C. & W. M.	1/16	⅛	⅛
C. & N. P.	⅛	⅛	⅛
P. C. C. & St. L.	¼	¼	¼
Baltimore & Ohio	¼	¼	¼
Alley L. Chicago	¼	¼	¼
C. & N. W.	¼	¼	¼
Penna. Co	¼	¼	¼
R. W. & O.	¼	¼	¼

J. B. Dickson, J. C. Hechler, S. H. Brown, W. H. Barnes, Committee.

JOINT FASTENINGS.

Your Committee on Joint Fastenings in presenting the ninth annual report on the question, trust that the constant reiteration of the subject will not become tiresome to the Association.

The action of the Committee has been guided to a large extent by the resolution passed at the last annual meeting and has also taken advantage of the more liberal scope given them by the Executive Committee. You now desire to know what results have been accomplished and at what cost. But one short year has thrown little light on the subject. We look for and have in some forms of improved joints been provided with the fish plate combined with the strongest known mechanical device—a truss or bridge, with the ties as abutments which secures to the rail the vertical support sought for.

It has been conceded that we must have a base support to rail ends; and conditionally of course we ask for the best and cheapest way of furnishing this support. In longer rails and miter-cut joints we may look for a saving which will facilitate the adoption of improved yet more expensive joints. One thing, however, those improved joints will have to compete with, will be a new angle bar which will be made better and cheaper by manufacturing them of standard sizes. The joints, samples of which are here for your inspection, tested by the committee, are the Weber, Continuous, Price, Eno, Truss and Heath.

Of the first two mentioned, 5,000 of each have been laid in track this year by one member of the committee, but which have not been in use long enough for a comparison in cost.

The Price and Eno were sample joints in service for two years with apparently good success. The Truss joint is one of a lot of 500 in service for over six years with a showing in their favor of over 30 per cent. saved in maintenance and probably 60 per cent. in saving of the life of rail. Moreover three-fourths of those joints will be fit to relay with new steel when present rail is worn out. The Heath is reported as giving good satisfaction as a rule and we have a mass of correspondence relative to this joint which will be read at the close of this report at the discretion of the members.

That this list is no longer or omits mention of joints previously reported on is not an oversight of your committee, for attempt at securing further information proved futile.

Mention might be made here of a new method now being introduced for forming continuous rails much cheaper than the electric method of welding, which consists in casting molten metal round the rail ends filling the space and melting the end of rails so as to practically weld them together. The cost of this is said to be about $3 per joint, and weight of metal used about 100 lbs.

Messrs. John D. McInnis & Son, of Medrid, Miss., report a device in use as a joint fastening which has

been in service over two years, and very much desire that this association send a committee to examine and report on their investigations. J. W. WRIGHT, Chairman.

TRACK TOOLS.

The members of the committee each endeavored to collect the best forms of such tools as were to be considered and present them for a competitive trial. In pursuance of this plan the committee held a meeting at Chicago July 2, and gave to each tool recommended careful consideration and actual trial in service. As the result of our labors we have the honor to present for your approval and adoption as standards models and blue prints of eight of the ordinary track tools which should be supplied to each Section Foreman.

Track Level.—Your committee take special pride in submitting a new design. The form recommended embodies the important requisites of accuracy, simplicity, light weight and durability. While the ordinary level board answers very well in surfacing level track, the super-elevation of outside rail on curves is always more or less a matter of guess work. The form recommended, possessing a graduated scale, will enable track men to give the required elevation with precision.

Track Chisel.—Form and weight recommended as best adapted for durability and effected work. The relative length above and below the eye being such as to secure the longest life for the chisel.

Sledge.—Your committee would strongly recommend that a sledge be furnished each Section Foreman and that track men be prohibited from using spike mauls with track chisels. The saving in chisels will pay for sledges and leave a good margin on the side of economy.

Track Gage.—Your committee is of the opinion that a straight wooden gage is preferable to a metal gage and preferable to a gage with fork or curved ends. The addition of the lug for guard rail gage will not interfere with its use around frogs and switches. Width of guard rail gage is based on standard adopted by the M. C. B. Association.

Surfacing Board and Blocks.—Model is simple and inexpensive, and is a great improvement over the old form and manner of using a surfacing board. This board is the invention of a Section Foreman, and it speaks well for the ability of our foreman to improve on methods and appliances necessary in their work.

Verona Spike Puller.—For pulling spikes from behind guard rails, frogs, etc., when they cannot be engaged by a claw bar. It is simple and inexpensive, but is a great labor and time saver especially in large yards.

Track Wrench.—To be made from one piece of solid steel and die forged. Jaws to have four sides in order to fit both square and hexagonal nuts.

Lining Bar.—To be made of solid steel, square toward bottom and diamond pointed.

With the exception of the Surfacing Board, the forms recommended for standards are unpatented and can be manufactured by anyone.

The thanks of the committee are due the Verona Tool Works for making models and blue prints without charge.

GURDON W. MERRELL, J. A. PRENTICE, J. C. HECHLER, W. H. MAUTZ, T. HICKEY, Committee.

We shall, if possible, show cuts of the various tools recommended, and therefore omit the committee's specifications.

"The Joint Traffic Association."

The foregoing title is the name which it is proposed to give to the new organization which the railroads of the Trunk Line and Central Traffic Associations have now under consideration and which has been the subject of various meetings, as reported in the *Railroad Gazette* of July 26, Aug 2 and Sept. 27. The Presidents met in New York City on Oct. 10. to consider the articles of agreement as they had been revised by a committee of eight (afterwards enlarged to ten), of which Mr. H. J. Hayden was chairman, and it is understood that, with certain amendments made on that day, the document received practically unanimous and final consent; but it was referred back to the committee to be rewritten and it will come up for formal approval at a meeting to

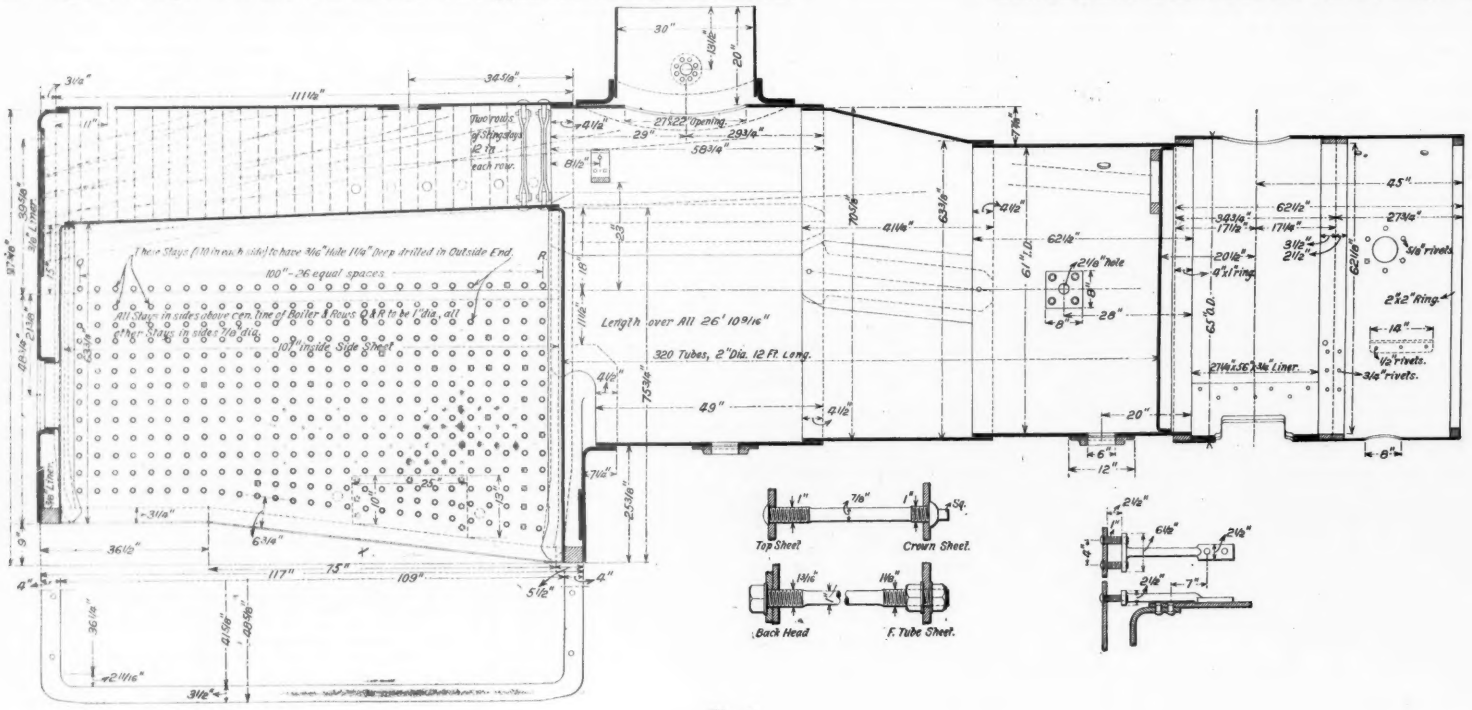


Fig. 6.

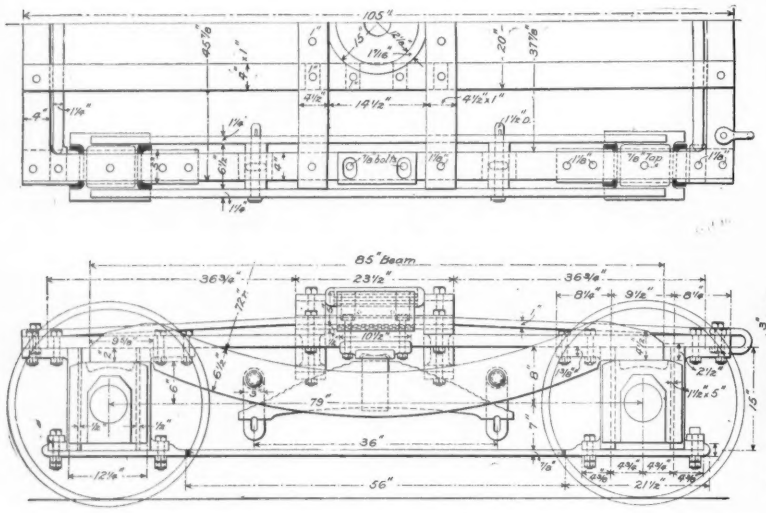


Fig. 5.

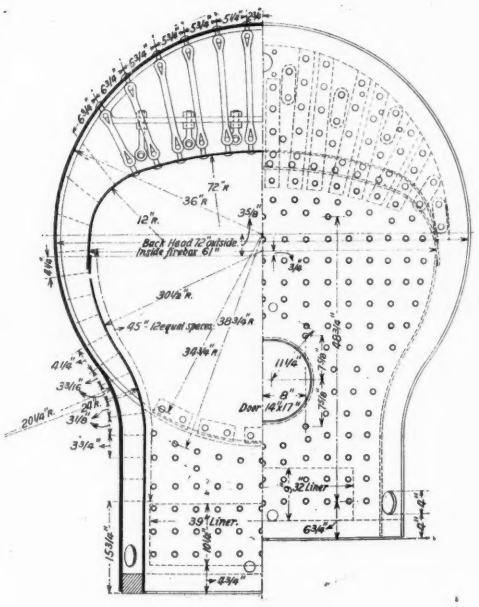


Fig. 7.

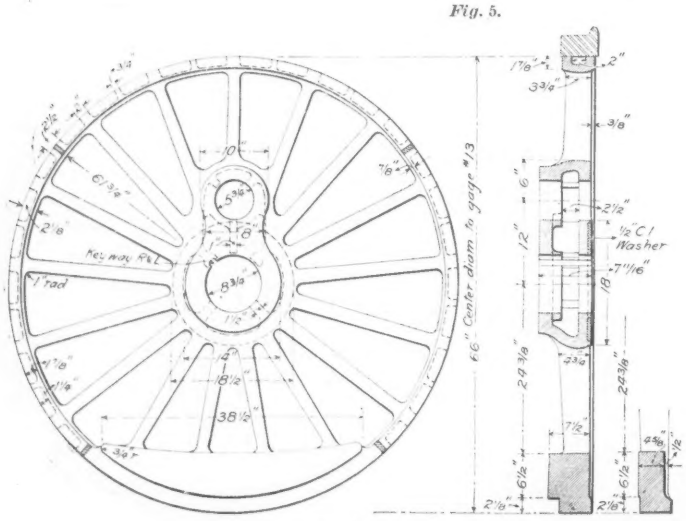


Fig. 2.

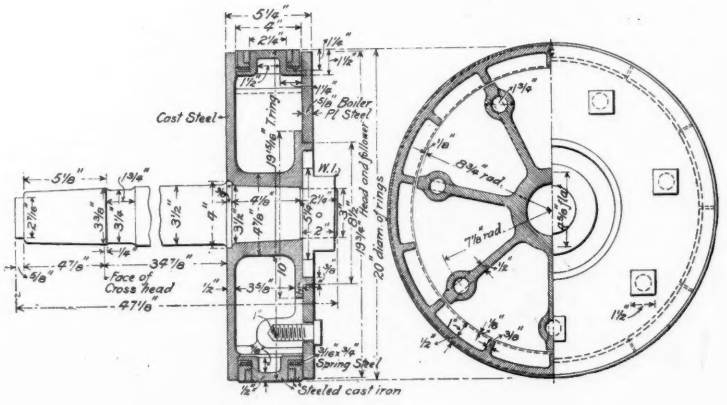


Fig. 4.

Details of Heavy Express Passenger Locomotive for Cleveland, Cincinnati, Chicago & St. Louis Railway.

be held on Oct. 30. The agreement has not yet been made public, but the daily papers got hold of the substance of it on the day following the meeting and published summaries. Following are its main features:

The preamble recites that one purpose of the organization is "to aid in fulfilling the purposes of the Interstate Commerce act"; another is to secure reduction and concentration of agencies. Coal, coke, iron ore, limestone and petroleum are excepted, but aside from these commodities the agreement includes practically all the competitive traffic of the roads interested which passes through Buffalo, Pittsburgh, etc., and the Board of Directors is authorized to construe the meaning of the term competitive, so as to include, when necessary, traffic which is competitive in a commercial sense, although not strictly so in a geographical sense.

There is to be a Board of Directors, consisting of one representative from each "system." The nine systems are the Grand Trunk, Vanderbilt, Lackawanna, Lehigh Valley, Erie, Pennsylvania, Baltimore & Ohio, Chesapeake & Ohio and Wabash. Provision is made for the enlargement of this committee if other systems join the association. This Board is intended to remain in practically continuous session in New York City. The members are to elect a chairman annually, who may or may not be one of their own number. This Board shall construe the agreement. All questions before it must be decided by a three-fourths vote. The action of the Board, except as to standard rates, shall be subject to appeal to the Board of Arbitration; but its decisions shall be complied with until such appeals are decided.

The Board is to appoint three commissioners.

The Board is made the exclusive agent of each company and its action is binding on each company until disapproved by a resolution of the Board of Directors of such company.

The Board shall make rates and no company shall vary therefrom except by resolution of its Board of Directors, and then only after thirty days. It may also decide the proportions of different roads in a through rate.

The Board shall, "as far as practicable, confer and cooperate with the Interstate Commerce Commission." It is to secure an equitable proportion of the traffic to each company and deal with outside competition.

The agreement recognizes that the fast freight lines ought to be limited or possibly some of them terminated, and the signers are pledged to co-operate in doing this. The Board may define the authority of agents and limit the number of soliciting agents employed and may organize joint agencies; no agent objectionable to the Board shall be retained. Agents may be carried on the pay rolls of the Board.

Any unauthorized concession whatsoever, is a violation of the agreement, subject to a fine of $5,000 or less; but the Board may make the fine larger if the gross revenue of the unauthorized business exceeds that sum. The Association is to be supported by contributions by each company of 1 per cent. of its gross earnings on the traffic covered by the agreement but if too much money accumulates, the percentage may be reduced.

A board of three arbitrators is to be appointed by the Board of Control (Presidents) hereinafter referred to. This Board of Arbitrators will probably be always in session, the same as the Board of Directors, and to it may be appealed all questions except the determination of standard tariff rates and fares. This, however, does not prevent reference to the arbitrators of questions concerning differentials.

There is to be a Board of Control composed of the Presidents of all the companies belonging to the Association. This Board is to meet on the request of three Presidents; questions must be decided by a three-fourths vote; questions concerning standard rates, which the Board of Directors are unable to settle, may be referred to the Board of Control. A member of the Board of Control unable to attend a meeting may only send the next ranking officer having jurisdiction over traffic. The Board of Control is to appoint an auditing committee.

The agreement shall not be effective until the Board of Directors has received certified copies of a suitable resolution of the Board of Directors of each company. It is for the term of five years.

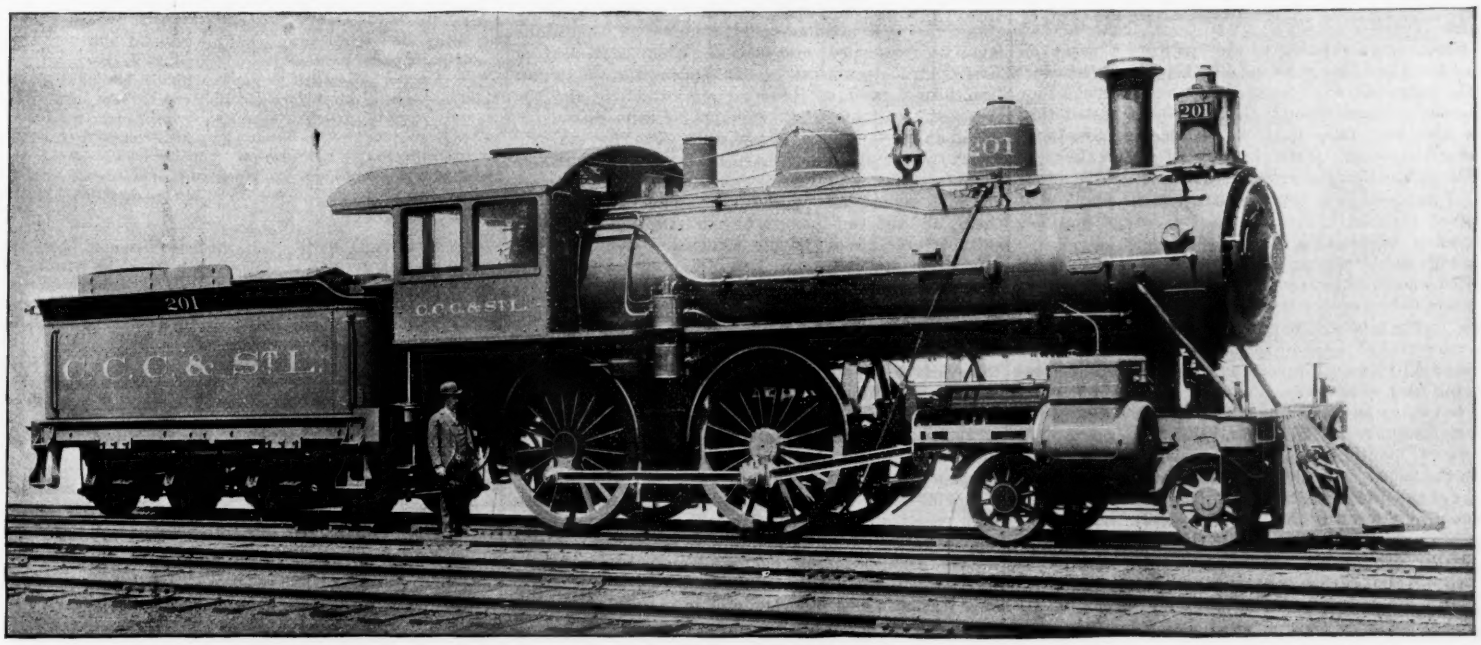


Fig. 1.—Heavy Express Passenger Engine for the Cleveland, Cincinnati, Chicago & St. Louis Railway.

Mr. WILLIAM GARSTANG, *Superintendent of Motive Power.* *Built by the* SCHENECTADY LOCOMOTIVE WORKS, *Schenectady, N. Y.*

The New Schenectady Eight-Wheelers of the "Big Four."

The Cleveland, Cincinnati, Chicago & St. Louis has lately had built two very powerful eight-wheel locomotives to handle the heavy passenger trains on the grades of the Cleveland & Cincinnati Division from Cleveland to Galion. These locomotives, built by the Schenectady Locomotive works, are from the designs of Mr. William Garstang, Superintendent of Motive Power of the road and to him we are indebted for the drawings. The train which they are designed to haul is No. 11 leaving Cleveland at 3:30 p. m. and arriving at Galion at 5:40 p. m. The distance covered in this two hours and ten minutes is 79.8 miles and there is a total ascent of 595 ft. The grades are not heavy but the climb is steady. The profile of this road may be seen in the *Railroad Gazette* of 1893, page 391. These engines have been doing remarkable work, one of the best performances being the hauling of a train whose weight was 582 tons (including tender) the 79.8 miles in 1 hour and 55 minutes, actual running time, an average of 41.7 miles an hour.

The engines in external appearance reflect credit both on the designer and builder. The height above the rails prevented the placing of the safety valves on the dome and they were put back of it as shown in the engraving from a photograph.

One of the most striking features is the large boiler and firebox, detail drawings of which are shown in Figs. 6 and 7. The diameter of the shell at the sheet on which the dome is placed is 72 in. and the firebox is 9 ft. long. The crown sheet is stayed with radial stays, the first two rows at the front being sling stays. The dome is attached to the shell by a flanged ring which is now thought a better method than by flanging the sheets.

The total heating surface is 2,175 sq. ft., while the largest for an eight-wheel engine of any of those exhibited at the World's Fair was 1,930.4 sq. ft.; this was engine No. 999 of the New York Central & Hudson River, which had 1,000 lbs. more weight on the drivers than this engine. For drawings and description of this, see *Railroad Gazette*, 1893, pages 312 and 368. The firebox of No. 999 was also 3/8 in. longer than in these locomotives.

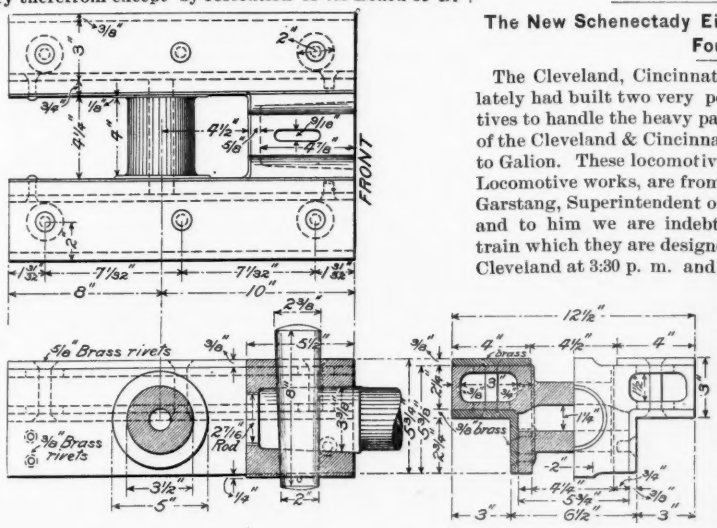


Fig. 3.—Details of Crosshead—C., C., C. & St. L. Locomotive.

Figs. 2, 3 and 4 are details of the driver, crosshead, piston and piston rod. They are made of cast steel in order to reduce the weight as much as possible. In Fig. 2 it can be seen that the driver has a cast iron ring, 1/2 in. thick, shrunk on the inside of the hub. The design of the crosshead, Fig. 3, is for the standard four-bar guides used on this road. The piston shown in Fig. 4 is hollow, and has a plate of boiler steel 5/8 in. thick as a cover on the head end. Dunbar packing is used. Details of the engine truck are given in Fig. 5. It is of the rigid-center type, with a wheel base of 79 in. The center plate is of cast iron. The following table gives the general dimensions:

Description.	
Type	8-wheel
Name or Number	200 and 201
Name of builder	Schnectady Locomotive Works
Name of operating road	Cleveland, Cincinnati, Chicago & St. Louis
Gage	4 ft. 8½ in.
Simple.	
Kind of fuel to be used	Bituminous coal
Weight on drivers	83,000 lbs.
" " truck wheels	43,000 lbs.
" total	126,000 lbs.
General Dimensions.	
Wheel base, total, of engine	23 ft. 10½ in.
" " driving	8 ft. 6 in.
Height, center of boiler above rails	8 ft. 6½ in.
Heating surface, firebox	179 sq. ft.
" " tubes	1,996 sq. ft.
" " total	2,175 sq. ft.
Grate area	30.75 sq. ft.
Wheels and Journals.	
Drivers, number	8
" diameter	72 in.
" material of centers	cast steel
Truck wheels, diameter	Steel tires, 33 in.
Journals, driving axle, size	8¾ × 11½ in.
Main crank pin, size	5½ × 6½ in.
Cylinders.	
Cylinders, diameter	20 in.
Piston, stroke	24 in.
" rod, diameter	3½ in.
Kind of piston rod packing	Jerome metallic
Steam ports, length	20 in.
" " width	1⅝ in.
Exhaust ports, length	20 in.
" " width	3 in.
Valves.	
Valves, kind of	Allen Richardson
" greatest travel	6 in.
" outside lap	1⅛ in.
" inside lap or clearance	Line and line
" lead in full gear	1/16 in.
Boiler.	
Boiler, type of	Radial stayed wagon-top
" working steam pressure	200 lbs.
" material in barrel	Carbon steel
" thickness of material in barrel	5/8 in.
" diameter of barrel inside	61 in.
Seams, kind of horizontal	Double riveted butt
" " circumferential	" " lap
Thickness of tube sheets	½ in.
" crown sheet	5/8 in.
Crown sheet stayed with	Radial stays
Tubes.	
Tubes, number	320
" material	Knobbled charcoal iron
" outside diameter	2 in.
" length over sheets	12 ft.
Firebox.	
Firebox, length	9 ft.
" width	3 ft. 5 in.

Firebox depth front	76 in.
" " back	64 in.
" material	Carbon steel
" thickness of sheets	⅝ in.
" brick arch ?	Yes
" water space, width..Front 4 in.; sides 3½ in.; back 4 in.	
Grate, kind of	Rocking finger with drop plate

Smokebox.

Smokebox, diameter outside	65 in.
" length	65½ in.

Other Parts.

Netting, wire or plate	Wire netting
" size of mesh or perforation	Three meshes per inch
Stack, straight or taper	Straight

Specifications for Steel Rails of Heavy Sections Manufactured West of the Alleghanies.*

BY ROBERT W. HUNT, M. AM. SOC. C. E., ETC.

In 1888 (*Transactions*, Vol. XVII., p 226) the writer had the honor of submitting to the Institute a paper on "Steel Rails and Specifications for their Manufacture." In his judgment the specifications were sufficient for "that day and generation." In the paper I stated that "the first duty falls upon the railroad engineer in designing his section. If that is bad the steel-maker will be heavily handicapped in trying to furnish a satisfactory rail. I suppose it is hopeless to expect the adoption of standard sections." That which I dared not hope has practically come to pass.

In 1885 the American Society of Civil Engineers appointed a committee to consider "The Proper Relations to Each Other of the Sections of Railway Wheels and Rails." The labors were supplemented by those of a later committee of the same society, appointed in 1890, and directed to submit a report on a series of rail sections ranging from 40 to 100 lbs. per yard, varying by 5 lbs.

It fell to my lot to be a member of the last committee, and its Secretary during the final and greater part of its labors. I mention this as evidencing my familiarity with the honest and careful efforts made to obtain the views of the leading railroad engineers of the country, harmonize differences and design a series of rail sections which would be in accord with their experiences and generally acceptable. At the same time steel-makers were consulted, so that the proposed sections might not present manufacturing difficulties.

It required three years of faithful work on the part of the committee, before they were able to make a full report to the Society. In August, 1893, their report was accepted and the committee discharged. While the constitution of the American Society of Civil Engineers prevented them from adopting the rail-sections as theirs—they are popularly so regarded and called; and what is better have been already largely adopted by the railroads of the country, and promise to soon be absolutely the standard American sections.

In my former paper I stated that I was convinced that the disappointing wear so often obtained up to that time from the heavier sectioned rails had "been largely the fault of the sections themselves." As I believe the Standard sections just named are good ones; if they fail to give satisfactory service in my opinion we must look in other directions for the cause. The years of continued experience since 1888 have made me all the more positive of the supreme importance and influence of the physical and mechanical treatment of the metal while being converted into steel and cast into ingots, and of the steel while being made into rails.

Since the presentation of my former paper, many changes in the routine of manufacture have been generally adopted by American rail-makers. "Hot heats" in the converter are strenuously avoided; greater care is exercised in teeming, and as to the character of the ingot moulds used; it is exceptional to throw ingots on their sides while the interior metal is yet liquid, and vertical furnaces, or so called gas soaking pits, have been adopted by the largest makers. By so handling the ingots and the use of such furnaces, and by being liberal in cutting off the top ends of the blooms, the danger of piped rails has been brought to the minimum.

My former statement that "the character of the permanent way of the railroads of the United States is improving each year," still holds good, and the demand on the mills for well finished rails is imperative. As a rule this has been well met by the makers, and I know the general finish of the rails delivered to the roads to-day is many per cent. higher than it was seven years ago. Much stricter inspection has been insisted upon, and it has borne its fruit.

The material interests of the country are just recovering from a period of great depression, and the coming year promises to be one of large rail purchases, and in many cases the roads will be compelled to replace comparatively light sections with heavier ones. The American Society rail-sections were designed to obtain as much work as possible from the rolls on the rail heads; at the same time it is impossible to get as fine grained steel in the head of an 80-lb. rail, as in a 56 or 60-lb. one, and it must not be expected that a coarse, open grained rail will wear as well as the finer one. To my mind this fact explains the whole "mystery" of the superior wear of the old, light-sectioned rails; many of which were of very bad chemical character. Now, if we cannot obtain the resistance to wear from the fineness of structure due to work, we must seek it from hardness and soundness due to chemical composition. And as we increase the sections we can with safety add to the hardness.

*A paper read at the Birmingham meeting of the Institute of Mining Engineers, October, 1895.

During the discussion of Dr. Dudley's paper (*Trans.* IX. 1881), I sought to defend silicon from some of the charges made against that element, and in a paper on "Bessemer Steels" read before the Franklin Institute, Jan. 25, 1889, I presented a large number of analyses of many kinds of steel to sustain the same position. And the makers of steel castings long ago demonstrated the value of silicon in obtaining soundness when added to the metal after conversion. In the specifications which Mr. P. H. Dudley prepared for the New York Central & Hudson River, he recognized the value of silicon; so have many European rail makers. But while we are seeking to make our rails chemically harder, we must not lose sight of an element which, while hardening also tends toward brittleness—phosphorus—the *bête-noire* of the steel maker. Hence the increase of carbon per centage must be governed by the amount of phosphorus present. Moreover, no matter how anxious we may be to obtain the best possible rails, commercial conditions must be recognized, and they are often controlled by geographical circumstances. It happens that the largest American deposit of Bessemer ore, which is also the cheapest, available to the makers of rails east of the Alleghanies, is low in phosphorus. The foreign ores which they would import have the same characteristic. Therefore, Eastern railroads can obtain low phosphorus and high carbon rails without paying an extra price for them, and the rail-makers have no trouble in getting suitable ores. West of the Alleghany Mountains the conditions are different. This difference has led me to prepare the specifications which I now have the honor to present.

The only practical source of ore supply for the western mills are the Lake Superior districts, and until lately the available supply of ore even moderately low in phosphorous was limited. For this reason the western standard of Bessemer pig iron was 0.10 per cent. phosphorous. Of course, steel rails made from such iron would have quite 0.11 per cent. phosphorus, and in many cases that element ran up to 0.12 per cent., and sometimes higher.

The later ore developments in the Lake Superior region, particularly on the Messabi range, have altered this, so that for next season it will be perfectly practible for the Western rail-makers to keep the phosphorus in their rail steel under 0.09 per cent. I know it will be said that even now there is not enough low phosphorous ore developed to permit the adoption of such a standard. I must take exception to this. Ore mixtures have been purchased based on the work's expected total production of Bessemer steel; as the metal came from the blast furnace it was made into soft steel for wire rods, billets, tin plate bars, etc., or into harder metal for rails, as the mill orders happened to demand. I believe the time has arrived when rail steel must be considered as a special metal, and the blast furnaces charged accordingly. Of course, this may cause some inconvenience, and slightly increased cost to the rail makers, but that should not prevent the practice, if it is necessary for the production of better rails. Such increase would not be very large, and the present condition of the trade would not indicate that the margin of profit is too narrow to allow its being incurred. But, if such is not the case, then let the rail-makers demand an extra price from the purchasers. If they can present a good case I have no doubt it would be allowed.

In regard to the claim of a too small available supply of low phosphorus ores; let us consider the figures. It is claimed that nearly 9,500,000 tons of ore will be shipped from the Lake Superior region this season, and fully 60 per cent. of this will be Bessemer; 5,700,000 tons of such ore would produce at least 3,000,000 tons of steel. The largest tonnage of rails of all kinds ever produced in this country was in 1887—2,139,640 gross tons. Since then, 1892 was the heaviest year, with 1,551,844 tons; while 1893 yielded only 1,136,453 tons. In 1892 Illinois made 450,553 tons and Pennsylvania 961,937 tons. Assuming that the Pennsylvania mills west of the mountains made 50 per cent. of the state's production, we would have a total western production of 931,447 tons. As there is no immediate prospect of a demand beyond that of 1892, I believe of the 3,000,000 tons of possible Bessemer steel, less than one-third of it can be kept below 0.09 phosphorus.

During the past year quite a large tonnage has been made under practically the conditions of these specifications, and from the experience with the rails in the track, and under the drop tests at the mills, I believe it will be proved that even a higher percentage of carbon can be used. But it is well not to advance too rapidly. The science of steel making is steadily progressing. Had the rail makers, East or West, been asked a few years ago for such hard steel it is doubtful if they would have undertaken the manufacture. Indeed, when the first high-carboned rails were delivered to the New York Central, the maker put himself on record as not being responsible for the damage which would almost certainly occur from their breakage under traffic. Nevertheless the rails were laid on the sharp curves below Spuyten Duyvil, and I believe up to this time not one has broken; and they have endured some five years of service.

The only important features in which the present specifications differ from those of 1888, is in providing for a chemical composition and drop tests. I have given my reasons for the former, and have added the latter as an additional safeguard, while increasing the hardness of the steel. I still insist on the test bars being used. I have left the guaranty as a matter of special understanding between purchaser and maker.

SPECIFICATIONS FOR STEEL RAILS OF HEAVY SECTIONS MANUFACTURED WEST OF THE ALLEGHANIES.

Section.

Sec. 1.—The section of the rail rolled shall conform to the temolate furnished by the railroad company, with an allowance in height of $\frac{1}{64}$ of an inch under, and $\frac{1}{32}$ over, being permitted in a delivery of 10,000 tons of rails. The fit of the fishing or "male" template shall be maintained perfect.

Sec. 2.—The weight of the rail shall be kept as near to .....lbs. per yard as is practical after complying with Section 1.

Lengths.

Sec. 3.—The standard length of rail shall be thirty (30) feet at a temperature of 60 deg. Fahr. Shorter rails of..... lengths will be accepted to the extent of ten per cent. (10%) of the entire order. A variation in length of ¼ of an inch longer or shorter than the above specified lengths will be allowed.

Finish.

Sec. 4.—The rails must be free from all mechanical defects and flaws, and shall be sawed square at the ends, and the burrs made by the saws carefully chipped and filed off, particularly under the head and on top of the flange.

Sec. 5.—The rails shall be smooth on the heads; straight in all directions, both surface and line, and without any twist, waves or kinks, particular attention being given to having the ends without kinks or drop. The hot-straightening shall be carefully done, so that gagging under the cold-press will be reduced to the minimum, and so applied that the rails shall not be made "lumpy." None such will be accepted except as No. 2 rails.

Drilling.

Sec. 6.—Circular holes..... inch in diameter shall be drilled through the web at.....inches from the bottom of the flange. The center of the first hole.....inches from the end of the rail; and.....inches from the center of the first to the center of the second hole. These holes must be accurate in drilling in every respect, and left without burrs.

Branding.

Sec. 7.—The number of the charge, the name of the maker, the month and year of manufacture, shall be marked in plain letters and figures on the side of the web of the rail, in such a position as not to be covered by the fish-plates when laid in the track.

Chemical Composition.

Sec. 8.—The carbon in the 70-lb. section shall not be below 0.43 per cent. nor over 0.51 per cent. In the 75-lb. section not less than 0.45 per cent nor over 0.53 per cent. In the 80-lb. section not less than 0.48 per cent. nor over 0.56 per cent. In the 90-lb. section not less than 0.55 per cent. nor over 0.63 per cent. In the 100-lb. section not less than 0.62 per cent. nor over 0.70 per cent.

The phosphorus shall not exceed 0.085 per cent.

The silicon shall not be below 0.10 per cent.

The remainder of the chemical composition of the steel to be left to the makers' judgment.

Tests.

Sec. 9.—While the heat is being cast, two test-ingots shall be made; the first from steel going into the first regular ingot, the other from metal representing the last one. These test-ingots shall be 3 in. × 3 in., and not less than 4 in. long. From these, bars at least ½ in. square shall be drawn at one heat by hammering. Each bar, when cold, shall be bent, without breaking, to not less than a right angle. Should one bar from a heat fail and the other stand the test, a third bar may be taken from a bloom rolled from the same ingot represented by the failed bar. If this stands the test it shall be accepted in lieu of the failed one. If the makers choose, more than the two test-ingots may be taken, but they must be from the steel of the first and last regular ingots. If this is done and a test-bar fail, another one may be drawn from the duplicate ingot and tested, and if it stands, accepted.

Drop Tests.

Sec. 10.—A rail butt from each conversion shall be placed either head or base upwards on solid steel or iron supports, the distance apart of which in the clear shall be 3 ft. for sections up to and including 70 lbs. and 4 ft. for all heavier ones, and upon them shall be dropped a weight of 2,000 lbs., falling freely from a height of 16 ft. for 70-lb. and 20 feet for all heavier rails. Should a test fail to stand the drop without breaking a second one may be made. If it also fails all rails made from that heat shall be rejected; but if the second test stands, then a third one shall be made, which if successful, the rails of that conversion shall be accepted.

Treatment of Ingots, Etc.

Sec. 11.—After the ingots are cast they shall be either constantly kept in an upright position until ready to be rolled, or else so maintained until the interior steel has had time to solidify.

Sec. 12.—No "bled" ingots or ingots from "chilled" heats shall be used in the manufacture of rails under this contract.

Sec. 13.—No ingots from badly-teemed heats shall be used, excepting as they shall be subject to the provisions of Section 17.

Cutting of Blooms.

Sec. 14.—After cutting off, or allowing for the "sand" or top end of each ingot, at least 12 in. more of seemingly solid steel shall be cut off that end of the bloom; a greater length than 12 in. being preferred; and if, after cutting such length, the steel does not look solid, the cutting shall continue until it does.

Heating.

Sec. 15.—Care shall be taken to avoid overheating the steel; and under no circumstances shall a "cinder" heat be allowed—that is, a heat high enough to cause the cinder to run off the steel as it is being drawn from the furnace. This does not apply to cinder which may be sticking to the under-side of the steel when drawn from a horizontal furnace, or to the bottom of an ingot when drawn from a soaking pit.

Inspection.

Sec. 16.—Inspectors representing the purchaser shall have free entry to the works of the makers at all times while this contract is being filled, and shall have all reasonable facilities afforded to satisfy them that the rails are being made in accordance with these specifications. The makers shall furnish them with the carbon determinations of each heat, and sufficient number of complete analyses to represent the average steel of each day's work.

Sec. 17.—The inspectors shall have power to reject rails made from insufficiently-sheared blooms; or from heats the test pieces or drop tests of which have failed; or from badly-poured heats; or from "chilled" heats; or from "bled" ingots. The rails made from insufficiently-cut blooms, if otherwise

EAST BOUND

Average Resistance 5480 pounds

WIBAUX — Mc CLELLAN — YATES — BEACH — CHAMA — SENTINEL BUTTE

Reference
Horse Power
Traction
Speed

WEST BOUND

Average Resistance 3350 pounds

EAST BOUND

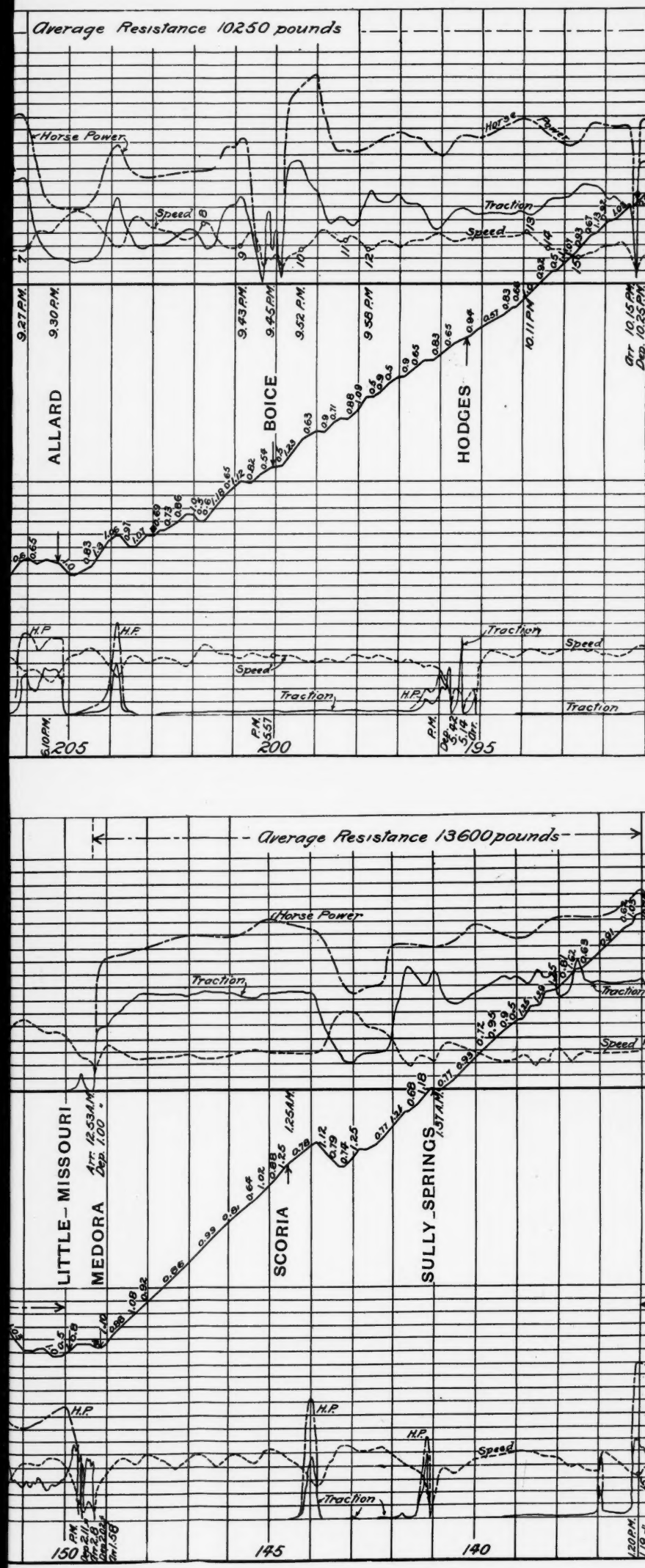
Second District

BELFIELD — SO. HEART — ELAND — DICKINSON

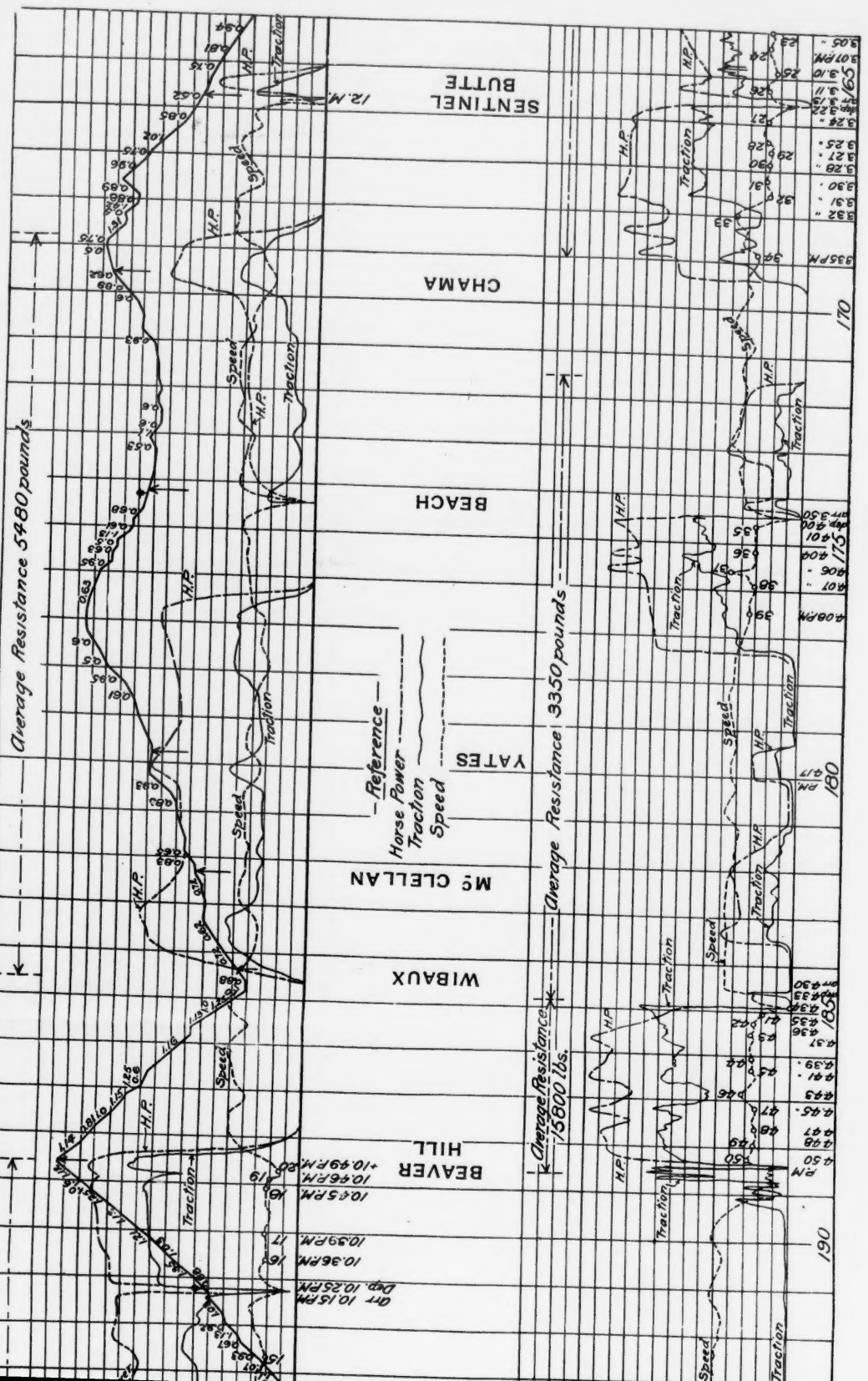
WEST BOUND

Average Resistance 6800 pounds

LTS OF DYNAMOMETER TESTS



PROFILE OF THE NORTHERN PACIFIC RAILROAD FROM GLENDIVE TO



DIVE TO DICKINSON, SHOWING RESULTS OF DYNAMOMETER TESTS

perfect, to be afterwards received as No. 1 short rails, if sufficient lengths have been sawed off to make an amount of steel equal to the original demand of 12 inches. The rails made from heats, the test pieces or drop tests of which have failed, may be accepted as No. 2 rails. The rails from a badly poured heat may be received as No. 2 rails; but if made from a "chilled" heat or "bled" ingot, to be absolutely rejected. By a badly-poured heat is meant one which, from any cause has been teemed without the control of the operator. A "chilled" heat is one which, by reason of the steel chilling, has to be either pricked or poured over the top of the ladle. A "bled" ingot is one from the center of which the liquid steel has been permitted to escape.

Sec. 18.—Imperfectly drilled, straightened (except "lumpy" rails) or chipped and filed rails shall be rejected, but will be accepted after being properly finished.

Sec. 19.—Rails failing to comply with Section 1 will be rejected as No. 1 rails.

No. 2 Rails.

Sec. 20.—The requirements for No. 2 rails shall be the same as for No. 1, except that they will be accepted with a flaw in the head not exceeding ¼ of an inch, and flaws in the flanges not exceeding ⅛ inch in depth, and may have been made from an imperfectly poured ingot, or heats from which the test-bars or drop tests have failed.

Sec. 21.—No. 2 rails to the extent of .... per cent. of the whole order will be received.

Railroads and Their Employees.*

Your committee have held two conferences, at the first of which it was decided to send a circular letter to the members asking for experience and opinions, and your committee desires to express its acknowledgment to the officers, representing nearly every leading line in the country, who have favored them with replies.

The foundation for the best relationship between railroad corporations and their employees is to be laid when the men are selected. Upon this much depends. "It is the bridge with the weak foundation that goes down with the spring freshet." Unless care and discrimination are exercised in the selection of the beginners, it would be idle to expect the best results in practice. It seems to be the consensus of opinion of our correspondents, and in this your committee joins, that the best service may be expected from young men not heretofore in railroad employment, who have grown up on the respective lines of road, each working with his home in sight and bound to the employing road by strong local ties. The boys who have grown up along a railway line are not as a rule altogether ignorant with regard to the manner in which train work is done; but even if they are, such ignorance is but a temporary difficulty, soon cured, and they are altogether likely, for the reasons stated, to give more faithful service than can be obtained from a transient or shifting class. . . .

There is no training for railroad work better than experience. A brakeman receives the training in the duties of practical railroading that should make him an efficient and capable flagman. For the position of conductor, clearheadedness is an indispensable requisite. It is a natural gift, soon evidenced in some trainmen and always lacking in others. If to this is added that measure of executive ability which secures from his crew respect and obedience, a thoroughly good conductor is the result. Different but equally valuable qualities, largely natural, but partly acquired, are essential to the locomotive engineer. Along the various stages of progress, the unfit or unworthy may or should drop out; until, upon a well regulated railroad, the conductors and engineers should be, and generally are, a picked body of intelligent men, well equipped for the responsibilities of their peculiarly onerous and exacting positions.

Not seniority, but character, intelligence and technical skill or knowledge should be the governing considerations in making promotions. But seniority should be given all the weight to which it is entitled, other things being equal—that is, in deciding between the claims to promotion of two men of equal merit, the senior should invariably be preferred, if for no other reason than to place in this way a check upon mere favoritism on the part of the appointing power. Those of us in authority should be on guard against ourselves.

No general rule can be laid down for official supervision of employees; a superintendent, to properly fill his place, must keep thoroughly in touch with all of the affairs of his road or division, not only using members of his staff for this purpose but drawing on every other source at his command, and among other resources by the encouragement of communications from the men. Every employee in the service, no matter how humble his position, should be made to thoroughly understand that any communication from him, whether oral or written, that bears upon the good of the service, is always in order.

Discipline should be strict, not harsh, and should be impartially administered. It is a very serious matter to dismiss a man from the service. The committee deplores a tendency to disregard humane practice in this respect. We believe that in administering discipline, it would be well to reduce, as far as possible, the number of suspensions from duty and the length of the same, and that disciplinary actions should be bulletined, avoiding the mentioning of names, but stating the action taken, and giving the reason why. A complete individual record should be kept, in which entries, both favorable and unfavorable, should be made, the same to be open at any time to the individual inspection of the party concerned. In cases of accumulated bad record, showing a succession of misdeeds, or in well proven cases of drunkenness, gambling, lying, gross negligence, and insubordination, dismissal should follow. The men should be made to feel that as long as they do right, their positions are secure, but that transgressions of the rules will be followed by disciplinary action. We believe that a conscientious treatment of this subject by those in authority, with pains taken in investigation, indicating a desire to know all the facts and to reach a just decision, will do much toward smoothing the rough edges of disciplinary proceedings.

Employees should be required to extend every possible civility to patrons, and this rule should apply to and be enforced in every department of the service.

We can hardly favor the giving of premiums for economy in the use of supplies, because it is not clear that they can be justly awarded, inasmuch as the conditions of service are so varying, but a system of awards for an absolutely clear record in train service during a given period, say of a year, such, for instance, as prevails upon the Fall Brook Railway, might be generally tested with possibly good results.

The committee is of the unanimous opinion that some system of "relief," to provide insurance, pensions, etc., is a valuable aid in strengthening the relations between the railroad and its employees. Such a plan, to be successful, should be not only sanctioned, but to a large extent be financially supported, by the railroad company. Its accounts should be audited by the company's auditor, while it should be officered by prominent employees. Its membership should be voluntary, with such intelligent effort to make its advantages clear and manifest to every one, as will be likely to make membership well nigh universal. We look with favor upon any well-matured plan to provide for sick, injured and superannuated employees.

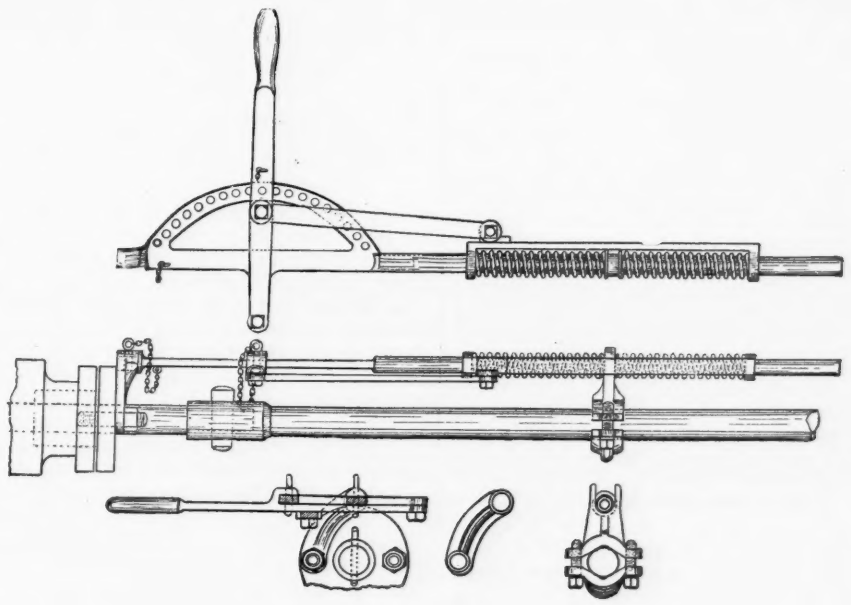
At each prominent terminal the railroad should make some provision for the comfort and recreation of its employees, and different kinds of technical training should be combined at such points under one roof. It might be under the auspices of the Railroad Branch of the Young Men's Christian Association or be in the nature of a club of railroad men, examples of which may be found at Cincinnati and at Newark, O., which are proving successful. The members of the committee have visited some of these railroad clubs. They have been found to equal in appointments many social clubs of good repute, and they are supported willingly by a majority of the train and yard men in their respective vicinities. There can be no question as to their refining influence upon the men, who by their existence are deprived of plausible excuse to seek recreation at saloons. When men of the class of our American railroad workers are given a chance to improve themselves, they always take advantage of it.

The duty of operating officers in these matters, if well performed, will go far toward the solution of the problems which confront us. It is the small things which go to make up the sum of human existence. Painstaking, patient effort to intelligently consider the small grievances will prevent many of the larger ones. Be as mindful of the interests of your employees as you expect them to be of the interests of their companies, always remembering the fact that might never did, and never will, make right, and that those who are under orders are entitled to fair, honorable, manly treatment as long as their conduct entitles them to a place in the service.

* A paper presented at the meeting of the American Society of Railroad Superintendents, at New York, Oct. 14, by a special committee, C. R. Fitch, Chairman.

Williams Locomotive Valve Setting Device.

The Q. & C. Company is introducing a valve setting device which we show in the accompanying engraving. Its object is to put the valve gear of a locomotive as nearly as possible under the same strain as it is while the engine is using steam, the lost motion adjuster artificially taking the place of the steam and enabling the valves to be accurately set for conditions such as exist in actual practice.



Williams' Valve Setting Device.

To use the apparatus, suppose the crank pin on the left side to be 6 in. back of back dead center with the reverse bar in full gear ahead. Throw the lever toward the cross head far enough to get a considerable strain against the clamp and then insert the pin through the lever and the segment over which it moves; now turn the crank to dead center and mark the valve rod with tram; leave one lever in the same position and turn the crank 6 in. ahead of dead center: throw the reverse lever in full gear back and turn the crank to dead center and mark again with tram. Proceed the same for forward dead center, also for the other side of the engine. In taking the cut-off the spring should be compressed in an opposite direction from that in which the valve rod is moving as the parts are being opened and closed.

In setting eccentrics compress the spring tightly against the clamp in an opposite direction from which the value rod moves as the eccentric is being turned for lead, thereby insuring an accurate adjustment in the valve gear at all points.

Some Facts Concerning the Use of Tie Plates.

BY BENJAMIN REECE, M. AM. SOC. C. E.

The growing interest in all questions pertaining to greater economy in tie renewals and the very remarkable increase in the use of Servis tie plates during and following a period of industrial inactivity, which was particularly severe on the railroad systems of this country, leads me to believe that a study and analysis of this movement during the present year can hardly fail to present many facts of interest to your readers.

From 1887 to Dec. 31, 1894, the total orders were a little in excess of 14,000,000 plates, whereas, during the first nine months of the present year the orders for Servis tie plates have been in excess of 7,500,000, and a conservative estimate of the business for the next three months indicates that the sales of the present year will exceed 9,000,000 plates. From this it will be seen that the sales of Servis tie plates during 1895 will approximate 65 per cent. of the total sales made during the eight years preceding. As further illustrating the growth of the use of this device, there have been two months since the 1st of January, 1895, during each of which the sales of any preceding year were exceeded. This extensive use of the Servis tie plate has in the main been with those lines which have given careful study to the preservation of ties, and those lines which, by the stress of a bad financial condition, have been forced into more economical methods, even though original outlays were involved.

In 1892 the plates 6 in. wide were very generally used; the tendency since that time has been to a narrower plate, the 5-in. width being a prime favorite, although where hard wood ties and a fairly stiff rail are used the 4-in. plates find many strong advocates. Of the Servis tie plates sold to date this season, the table following gives the percentage of each width ordered:

9	per cent.	were	for	plates	3¾	in.	wide.		
81	"	"	"	"	"	5	"	"	
3	"	"	"	"	combination plates		5	in.	wide.
7	"	"	"	"	"	"	6	"	"

Most of the 6-in. plates were used for joint plates, where the stagger of spike holes in angle bars required tie plates of more than 5 in. width for the spike holes in same to coincide with the punching of angle bars.

The Southern Pacific Company, which formerly used a 9 in. × 11 in. tie plate with an upper shoulder, giving a bearing area of 99 sq. in. on the ties, is now using Servis tie plates 3¾ in. × 8 in. on hard wood and the 5 in. × 8 in. on soft wood ties, experience covering some years having demonstrated that better results are obtained from the use of the narrower plates.

The following table, showing approximately the percentage of Servis tie plates used in hard and soft woods, will afford some idea of the varying conditions under which they are applied:

13	per cent. ordered for soft wood ties on new construction.
14	per cent. ordered for soft wood ties displacing oak ties in renewals.
17	per cent. ordered for oak ties in renewals.
56	" " " " soft wood tie renewals.

Many lines have been testing the Servis tie plates on cedar and other long lived soft wood ties, with a view to using them where oak ties had formerly been used.

With an effective tie plate, good cedar ties will outlast two of oak, so that a great saving is promised by such substitution. While this phase of the question has only been seriously considered during the past few years, that it has gained a strong hold on many lines is evidenced by the fact that 14 per cent of the year's orders are intended for such use. The plates used on oak ties are largely on curves, in switching yards, under plank-ways, tracks laid in streets, bridges, tunnels, etc.

As indicating the time of service in the track, on which the present year's orders were based, we give the following table:

4%	of orders were from lines first using them in or before	1888
6½%	" " " " " " " " "	1889
7%	" " " " " " " " "	1890
8%	" " " " " " " " "	1891
2%	" " " " " " " " "	1892
1½%	" " " " " " " " "	1893
1½%	" " " " " " " " "	1894
3%	" " " " " " " " "	1895
13%	construction	1895

From the table it will be seen that 79 per cent of the orders were from lines which have used the Servis tie plate since 1891 or earlier, which would make from four to eight years' experience, so that the value of these plates as an economical addition to track maintenance is fully established, and shows the experimental stages of its use have been passed.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.

Published Every Friday

At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We noted last week, as an interesting statement very modestly made in the annual report of the New Nork, New Haven & Hartford, the purchase by that company of the electric railroad lines of Stamford, Conn., which makes a gap in one of the ambitious parallel line schemes. Since that writing the newspapers have announced the purchase of the Meriden electric railroad, and the story of the purchase has been denied by some of the officers of the Consolidated. We do not believe, however, that we hazard very much in saying that this denial is to be taken in a Pickwickian sense. Meriden is a very strategic point as regards electric railroads, and it is a capital piece of defensive strategy to get hold of that system; and there is little doubt, we believe, that the control has already passed into the ownership of the Consolidated.

One of the electrical journals says that the Grand Trunk is about to adopt the electric locomotive for the tunnel service under the Detroit River at Port Huron. We are informed by that journal that the locomotives now working the tunnel weigh 95 tons and have eight drivers; that the "cut through the rock is lined with steel with a backing of a peculiar kind of asphalt"; that the steam and the excessive heat from the locomotives have such an effect on this backing that it is rapidly deteriorating and that in other ways the locomotives are injuring the tunnel structure; hence the determination to use electric locomotives. With a few corrections this item will pass. The tunnel is not under the Detroit River, but under the St. Clair River. The locomotives now used have not eight drivers, but ten, and they weigh in working order 195,000 lbs., all on the drivers. The tunnel is not lined with steel, but with cast-iron. The backing of the lining is not asphalt, but Portland cement grout. No injurious effect has been produced upon this lining by the steam or heat from the locomotives. And finally, the main proposition is not true; the Grand Trunk is not about to adopt electric locomotives for this service.

The paper by Mr. Robert W. Hunt on "Specifications for Steel Rails," which appears in this issue, has some points of unusual interest. It will be observed that he says that the demand for well-finished rails is imperative; that as a rule this demand has been well met by the makers; that the general finish of rails delivered to the roads to-day is many per cent. higher than it was seven years ago; that much stricter inspection is insisted upon, and has borne its fruit. It is satisfactory to get such testimony from so high an authority; and yet a number of complaints have reached us in the last year of the bad finish of the rails delivered. The assertion is made, and that by careful and well-informed engineers, that the mills are getting the advantage of the improved sections in the greater ease of manufacture, and they are not giving the roads a corresponding advantage in finish. We take it that the two statements are not irreconcilable; that is, that the average finish is to day "many per cent. higher than it was seven years ago," and that, on the other hand, there is still ground for complaint. As we have suggested before, there seems to be no way of getting over this, but by paying for competent inspection, and if necessary, paying a little higher price for rails to meet the requirements of the stricter inspection. Surely at the prices now made there should be no difficulty in getting good finish.

Peculiar interest attaches to these specifications in that they are prepared for the mills west of the Alleghanies. It sets forth the conditions that obtain, and that must be observed in the shifting westward of the center of gravity of ore supply and rail making, and we have been especially interested in reading what Captain Hunt has to say as to the control of phosphorus in the western ores. He anticipates the objection to his specification of 0.085 phosphorus as the highest limit, by showing the available supply of low phosphorus ores, and also by the suggestion that "the time has arrived when rail steel must be considered as a special metal and the blast furnaces charged accordingly." He modestly suggests to the railmakers that, even were the cost slightly increased, the present condition of the trade would not indicate that the margin of profits is too narrow to allow of that increase. We may add that there is considerable apprehension in the minds of railroad men that the margin of profits will shortly be enlarged, and that they would be likely to object very strongly to being asked to pay any part of the increased cost involved in treating rail steel as a special metal.

The chemical composition clause of the specifications illustrates remarkably, to one who has followed rail history, the changes that have taken place in the last eight or ten years. It will be observed that the highest carbon specified is 0.7, that the lowest specified for a 100 lb. rail is 0.60 and that the lowest specified for a 70-lb. section is 0.43. In the famous contention that soft rails wear better than hard, 43 carbon steel was looked upon as a hard rail, which, by the way, was one of the fundamental fallacies of that position, as we have frequently taken occasion to remark.

It has often fallen to our lot in very recent years to point out the fact that the rapid-transit situation in New York is fast being modified by the improvements in the existing surface lines. It has long seemed improbable that a new independent underground system, serving the whole length of the city, could pay even a very moderate interest. It has long been evident that private capital could not be induced to embark in such an enterprise. It has long been certain that the development of the surface systems, worked by cable and electric power, with very frequent cars, clean, well lighted and warmed, and with a liberal system of transfers, would take a great deal of the short-trip business which crowds the elevated lines. The surface cars have certain great advantages over any possible arrangement of elevated or underground cars. They can be boarded at the sidewalk level, any time and anywhere. For very many passengers these advantages more than offset the higher speed possible on lines above or below the surface of the street, and stopping only at stations. The working of this principle is becoming painfully manifest to those steam railroads that have to compete with electric street lines. It has been foreseen that as a consequence of all these conditions the crowding of the elevated roads would be diminished, and the prospects of the underground road would become dimmed as the service of the surface lines improved. The obvious answer to all this is that passenger movement grows as facilities are increased; and that in a city so vast as New York, a great city still growing fast in wealth and population, there will be a paying business for all the existing and proposed transportation lines. Within limits this is true, and it might be good policy for New York to build the underground road and run it at a loss for a decade or more; into that question we will not enter now. We started out to call attention to the fact that conditions which have been ignored or undervalued in the popular discussion of this subject are now forcing themselves forward; and that some of the daily papers of New York have already discovered that the "demands for rapid transit are less urgent and actual and more academic than they were a year or two ago."

Glorification of the division superintendent is in the air this week. At the meeting of the American Society of Railroad Superintendents, which is composed largely of division superintendents, a number of interesting questions concerning the scope of the division superintendent's authority were discussed. A feature of the meeting was the speech of Mr. Stevenson, formerly a prominent member of the society, and who has since held various higher positions which make him a good judge of the requirements of efficient railroad administration. He paid a high tribute to the value of the work done by division superintendents and his remarks brought out the most rousing applause of the meeting. On Wednesday, the opinions which the division superintendents had expressed concerning their own importance were corroborated by Colonel Haines in his address at the meeting of the American Railway Association. This address will be found on the first page of this issue. We are glad to note that these views agree with the preaching of the *Railroad Gazette*. The most important improvement needed in division superintendencies is general improvement in salaries, so that the men holding these positions—which are so much more important than they seem to the superficial observer—can be inspired to improve themselves where they are, instead of being obliged to direct their whole ambition to getting a higher office. Another subject prominently before the superintendents was discipline without suspension, which we may perhaps term Brown's discipline. The payment of premiums for good records, which is a feature of the discipline on Mr. Brown's road, was recommended, though rather timidly, in the committee's report, which we print. This timidity is largely due, no doubt, to the feeling that members cannot act on the recommendation for lack of money. In this connection we are pleased to note that an ex-division-superintendent, Mr. C. L. Rossiter, now a president, has found himself able to put this theory in practice. Mr. Rossiter is now on the Brooklyn Heights [street] Railroad, and has just issued the following notice to conductors and motormen:

> In connection with the new order requiring all conductors and motormen to wear full uniform, the Board of Directors of this company has authorized the setting aside of the sum of $10,000, to be divided among conductors and motormen as follows:
>
> All conductors and motormen in service this date and who, between now and May 1, 1896, shall have had no accident causing either injury or damage to other persons or property or to the company's property, and who have not been suspended for violation of the company's rules, will receive on that date a pro rata share of the above sum. . . .

We do not know how much this sum will allow to each man; probably but a small amount; but the spirit and method are highly commendable. If the premiums turn out very small, we would suggest to the employees that an effort to get the gross amount increased would be a much more hopeful exercise of their activities than some of the things usually done by employees to get more money out of their employers.

The New Trunk Line Agreement.

We publish in another column a synopsis of the new agreement under which it is proposed to practically unite the Trunk Line and Central Traffic Associations. (These associations are not now abolished, but their absorption in the new association seems to be their destiny.) We do not print the agreement verbatim, as dozens of changes were made in it after the meeting of Oct. 10, and it has yet to receive the formal approval of 16 boards of directors, one of which boards sits in London. Our summary, however, gives the essential points of the agreement and fully shows its spirit.

And, indeed, now, as always in the past, an agreement of this kind between railroads depends, in the absence of a pool, upon the *spirit* in which the companies go into it. One of the most conservative, yet most hopeful, of the men who took part in the preparation of this agreement said that he "didn't care much about what was written in the document;" his confidence was based upon the improved spirit that had been made evident to him by his intercourse with the others in the meetings.

The chief criticism of the present movement has been that the existing associations were fully adequate to the needs of the roads, that no new machinery was needed. This seemed a fair criticism; the existing associations are adequate if all the members act in the right spirit. The new agreement has many clauses which, doubtless, are not great improvements over former efforts in the same direction; but there is one which is entirely new and which is a radical innovation; no road will cut rates except by formal vote of its board of directors, and then only on 30 days' notice. This is so plain and sweeping that it would seem to compel every member to live up to both the letter and the spirit of its pledge. As far as spirit can be expressed in words on paper this indicates a much better spirit than has been seen in Trunk Line circles for a long time.

But the testimony of the most conservative men who have attended the meetings agrees with the tone of the written words, that the spirit of all the members, including those who have heretofore been most inclined to be indifferent, is better than ever before. Managers who have heretofore delegated authority to subordinates now take a lively interest themselves.

The establishment of the Board of Directors as a permanent thing shows that this interest is not to be temporary, for it is the understanding that this Board shall consist of thoroughly competent men, either those in actual control of traffic or men nearly as high, who can act without telegraphing home for instructions before every vote. The personnel of this board of nine when announced, will practically come very near settling the success or failure of the new departure.

That the ability and character of the members is a vital factor is apparent from the somewhat delicate plan on which the board is constituted. It is theoretically a board of impartial men, as much so as the present Board of Rulings, for some of the roads do not have votes or representation in any proportion to their business or their importance. At the same time, each member will owe his first allegiance to his own company, and he will rightfully be to a certain extent a partisan. Only broad-minded men of long experience can fill such a position as that. But evidently there was no likelihood that a large and strong board of outsiders could be agreed upon, and so it was decided to compromise between a very large committee, like the present joint committee, and a very small committee of, say, three. A large committee is unwieldly, slow and costly; a small one could not keep thoroughly in touch with the business. Each of the nine men will be expected to be able to keep the whole board fully posted as to the conditions on his own road or roads. The facts which he brings to the board will be partisan facts, but the opinions which he offers must be so just as to be impartial.

To surrender absolute power to a board like this for five years, as at first proposed, would have been out of the question. Such a rigid compact would inevitably go to pieces from its own inherent brittleness; and so the 30-day provision was inserted. At the same time a long term is a necessary feature, for no road would think of reducing its soliciting force without some guaranty that the new conditions are to continue. That the soliciting forces must be reduced seems inevitable. Theoretically the men can be retained and their discretion restricted, but practically the air will be greatly cleared if some men can be discharged. We do not expect, however, to see any sudden establishment of joint agencies, or anything but a very slow modification of existing soliciting arrangements. Any road which has good men will doubtless find it easy to keep them if it gives them instructions that conform to the spirit of the agreement.

The clause in the agreement about the Interstate Commerce Law virtually pledges the roads not to attempt pooling. This is of no particular importance, but it indicates that those railroad lawyers who have advocated experiments in this direction, with a view to trying to show the law unconstitutional if the action of the roads should be challenged, have been "turned down." The main power possessed by the Board to fulfill its function of distributing traffic is the power to make differential rates. Commissioner Goddard and his associates possess this power now, but they necessarily work slowly, and, until within the last two or three months, roads losing traffic, even for a short time, have always been too impatient to wait for justice to be done them. The new joint board ought to cure this difficulty. It will get statistics fully as promptly, if not more so; being larger it can act more boldly; and the losing roads, after the long discussion of the past summer, will be disposed to exercise more patience. Altogether, the strong hopes now entertained that maintenance of rates is again to be seen in the land seem to have a good deal of real foundation.

We do not look upon the provision for punishing violations by fines as of great importance. A management so unprincipled as to disregard such a well-considered pledge as will be made in joining this association, would be mean enough to evade payment of fines in some way or other. Such a road might contrive to steal enough traffic at one stroke to make the sacrifice of its deposit in the Association a small matter. If the members live up to the agreement no fines of any consequence will be necessary. If they do not live up to it the Association will be likely to go to pieces in spite of anything that the fine-imposers can do. Congressmen and others, who fear that the fine payments will be equivalent to pool payments, can safely wait until they hear of some five-thousand dollar checks being actually handed over, before they rush to the vindication of the law.

The most significant feature of the new agreement, aside from the one already mentioned—and, perhaps, equally important with that—is the continuous-session provision, which applies both to the Board of nine directors and to the Board of three arbitrators. A large majority of all the secret cuts ever made have doubtless had for one of their pretexts that any other remedy for the wickedness of "the other fellow" would be too slow. The rate-cutter says he would wait for the Commissioners to redress his grievance if only they would act promptly enough. With a Board sitting every day, or nearly every day, this excuse will be of no avail. Then again, the road which makes guerilla excursions now and then and, when detected, persistently stays away from meetings, depending upon the mollifying influences of time to soften the indignation of those whom it has injured, will be deprived of this resource; for every road will have a representative in the Board and if he absents himself from meetings, when there is any trouble in the air, he by that very act casts suspicion upon his road. The moral responsibility of staying away would be too great to be incurred, if he wished to maintain his reputation for honor.

The English Brake Trials.

We gave last week some extracts from the report of Mr. Worsdell on some comparative trials of the efficiency of the plain automatic and quick-acting Westinghouse air-brakes, which were made on the North Eastern Railway of England last May, and also tabulated data. These trials were made with various lengths of train, from a minimum of 12 cars to a maximum of 30, all of which appear to have been six-wheeled passenger carriages. The stops were made at speeds varying from 35 to 66¼ miles an hour and were not of a character to call for any special remark, in view of the conditions under which they were made. In his report, Mr. Worsdell indicates that the average retardation, or stopping power, of the plain automatic brake was 7.01 per cent., while that of the quick-acting brake was 8.48 per cent., which shows an increased efficiency of about 21 per cent. over the plain automatic brake. It is interesting to note some of the conditions under which these brake trials were made, both as affecting the results and for comparison with the practice in this country.

In the first place, the portion of the weight of the engine which was braked was but 19.76 per cent. In this country about 48 per cent. of the weight of eight-wheeled engines is used for a braking power on the drivers and, where such engines have also a brake on the leading truck (a practice which is being rapidly extended), about 73 per cent. of the entire weight of the engine is utilized for braking. The tender of the engine used in the brake trials was braked to 41.91 per cent. of the weight. In this country it is customary to utilize 90 per cent. of the light weight of the tender for this purpose, which is about 45 per cent. of the full loaded weight, and which may be regarded as about 60 per cent. of the average weight when in service.

The braking power on the carriages of the trains used in these trials was about 70 per cent. of the weight. There are two features respecting the application of the brakes to the carriages which present a contrast to American practice. All the coaches used in these trials were of the six-wheeled type, and only four wheels had brakes applied to them. Since it does not appear likely that the weight of the carriage is very unevenly distributed among the three pairs of wheels, it is evident that nearly one-third of the maximum stopping efficiency of the brakes is sacrificed through the practice of braking upon only two of the three pairs of wheels. Upon the assumption, also, that but little more than two-thirds of the total weight of the carriage is carried by the two pairs of wheels braked, it is evident that the braking pressure applied to those wheels is about 100 per cent. of the weight which *they* carry to the rail. Under the conditions which prevail in this country, it is found that a braking power of such a high percentage of the weight is attended with considerable injury to the wheels through skidding, and it is difficult to believe that this trouble would not result from the use of such high braking pressures under any other conditions. While, therefore, the English carriages have a much higher braking pressure on those wheels which are braked than that which is customarily employed on the wheels of passenger cars in this country (90 per cent.), and considerably greater injury to wheels is therefore likely to result, the total effective braking power on the English carriage is only about 70 per cent. as against 90 per cent. for passenger cars of the United States.

The arrangement of the brake apparatus on the carriages used in these trials is described in Mr. Worsdell's report as the "converted" apparatus; that is, it was originally the plain automatic air brake which has been "converted" to the quick-action air brake, through simply replacing the plain triple valve by the quick-action triple valve, and this, Mr. Worsdell states, gives results which are "strictly comparable." In one sense, this may be true; but, in another, it would appear to do the quick-action brake a material injustice, as has already been pointed out in the criticisms of the English technical press. It will be remembered that in the second series of the Burlington brake trials, in 1887, Mr. Westinghouse presented his first form of quick-action brake. This apparatus was practically the same as the "converted" apparatus above mentioned; that is, the quick-action triple valve was applied to a brake apparatus having the same size of train pipe, hose, couplings, etc., as had formerly been used with the plain automatic brake. The trials of that apparatus at Burlington were attended with more disastrous shocks than those realized with the plain automatic brake; yet, when the size of the train pipe, hose and other accessory parts was afterward enlarged, to accord with the practice since adopted in this country, this earliest form of the quick-action brake has given as good results as those obtained from the form of quick-action triple valve which was adopted.

The longest train on the trials on the North Eastern was 30 cars, on which the "converted" brake seems to have worked very satisfactorily, while the operation of the plain automatic brake, under the same conditions, was attended with severe shocks and more or less destruction of draw gear, the train breaking in two. Had the trials included trains of considerably greater length, it is probable that they would have been attended with more or less severe shocks in the use of the "converted" brake, which would not occur at all with the use of the quick-action brake and accessory parts of the proper proportions. It is also not to be doubted that the results of the trials would have been considerably more favorable to the quick-action brake, if it had been applied to the carriages *as* a quick-action brake and not by conversion of the plain automatic brake apparatus.

The returns of gross earnings for the month of September, published last week by the *Chronicle*, show for 126 roads a gain of 4.57 per cent. over 1894. Certain unfavorable influences were acting during the month, among these a diminished cotton movement, a small wheat movement in the Central Western states, and, for railroads extending over a great area, thorough demoralization in rates. The spring wheat movement, however, has been very heavy, over 9 million bushels being delivered in Duluth in the four weeks as compared with a little over 4½ millions the year before. Almost 10 millions were delivered at Minneapolis as against about 8¼ millions the year before. The greatest increase in gross earnings is shown by the Great Northern, which amounts to over $417,000. Its September business was the largest in the history of the road. The Milwaukee & St. Paul shows an increase of about $273,000, and the New York Central $184,000. Five other systems show gains of over $100,000. The Northern Pacific, notwithstanding the freight blockade due to the burning out of the tunnel at Bozeman, shows a gain of $94,000 over the previous September.

It is announced in the daily papers that an express train is to be run through between New York and Boston, via. Middletown; that is, over the New York, New Haven & Hartford, between New York and Willimantic, and over the New England Railroad between Willimantic and Boston in five hours; there is to be no extre fare (on the present five-hour train over the Shore Line the fare is $6 one dollar above the regular rate), and the train is not to stop at New Haven. The Air Line Division of the New Haven road, New Haven to Willimantic, is being improved so as to permit better speed. All the rest of the line, except this 50-mile section, has two or more main tracks. The New Haven road thus signalizes its acquisition of the New England by a somewhat bold stroke. Evidently the spectacle of the Empire State express, earning $4,000 a day, the success of which is largely due to its democratic habit of accepting all comers at low rates, presents a strong temptation to the New Haven people to follow the New York Central's example. This move will be a hard blow at the Boston & Albany. It was reported a year or two ago that the New Haven Company had taken a big share of the sleeping-car passengers away from the Springfield line, and the arrangement of trains during the past summer would seem to indicate that there has been a similar change in the day pasenger business. It used to be said that, under the contract between the two roads, the Boston & Albany could always claim the right of running trains through in as short time as they were run by any other line but whether that clause will prove a sufficient defense for its interests in this case is not very clear. The fact that this new train is not to stop at any large city on the entire route makes it almost exclusively a through train. This being the case the New Haven people will probably regard it as an exceptional train. They will naturally object to a five-hour train over the Boston & Albany, carrying passengers at the regular fare, as it would give them the privilege of stopping off at Worcester, Springfield and Hartford.

The new train will not have to run so fast as the present five-hour train by a considerable percentage, the distance being about 20 miles shorter. Indeed the speed, including stops, is not much higher than that of the six-hour train via Springfield. As a matter of interest we append a table showing the rate of speed of this train as compared with that of the fastest trains now running by each of the three roads between New

York and Boston, together with similar data concerning the fastest trains between Jersey City and Washington. The distances are taken from the Official Guide. The Pennsylvania train referred to does not run to the Broad Street Station in Philadelphia, but there is another train which does run to that station, making the route about two miles longer, which takes only three minutes longer.

	Dist	Inclusive. Time.	M. p. h.	In Motion. Time.	M. p. h.
New York-Boston via Mid..	213	5 h 0 min.	42 6		
" Shore L..... ...	234	5 h 0 min.	46.8	287 min.	48.7
" Spfd	31	6 h 0 min.	39.0	347 min.	40.5
New York Buffalo, Emp. S..	440	8 h 40 min.	50 8	514 min.	51.4
Jersey City-Washn, P. R. R.	226	4 h 53 min.	46.3	.....	....
" " B. & O.	2.7	4 h 48 min.	47.3	.....	...

General Manager W. F. Merrill, of the Burlington, is reported as saying that the fast mail train over that road makes a higher speed than the Empire State Express of the New York Central This mail train, every day in the week, makes the run from Chicago to Council Bluffs. 500 miles, in 10 hours, and the time lost in running through city limits and stopping at railroad crossings, and changing locomotives, when deducted, makes the actual speed of the train in motion average 62 miles an hour.

Within the past week the grain movement on the roads west of Chicago has rapidly increased and some of the roads are already finding it very hard work to get enough cars. The gossips in Chicago said on Tuesday that the roads leading east from the city were getting so much grain that they talked of raising the regular rate, which is now 20 cents per 100 lbs., to the seaboard, although large shipments of grain, which are said to have been taken at secret cut rates, are not yet out of the way. The shortage of gondola cars, which has been widespread in the Pittsburgh-Lake Erie region for some weeks, is now being duplicated in the Alabama mining district.

The good people of Connecticut, that is, the forehanded ones, have our sympathies. Their fellow stockholders in the New York, New Haven & Hartford Railroad (who are rich enough and hard-hearted enough to hold the position of director) have voted that the time-honored custom of giving free rides to stockholders to the annual meeting of the road shall be discontinued. We tremble lest this painful example shall become known in Massachusetts and be followed by the Boston & Albany and Boston & Maine.

Street Railroad Convention.

The annual convention of the American Street Railway Association was held in Montreal this week, the first session being on Tuesday morning in Windsor Hall. President Hurt made a brief opening address which was followed by an address of welcome by Mayor Villeneuve, of Montreal. There was also an address by Colonel Stevenson, a member of the Montreal Board of Aldermen. Tuesday forenoon was taken up with the reading of the reports of the Treasurer and the Executive Committee. Our report of the subsequent sessions was not received in time for this issue. The exhibits were shown in Victoria Rink adjacent to the Windsor Hotel. Many exhibits were not in position on the first day; we append a list of those which were:

EXHIBITS.

Adams & Westlake Co., Chicago, Ill. Acme automatic car window shades and curtains.
American Rail Joint & Mfg. Co., Cleveland, O. The Bartholomew street rail joint.
Badger Mfg. Co., Chicago, Ill. Overhead line material and trolley bases.
Babcox & Wilcox Co., New York City. Steel forgings.
Benedict & Burnham Mfg. Co., Waterbury, Conn. Solid one-piece copper rail bond and trolley, feed and magnet wires.
Bushnell Co., Ltd., Montreal. Railroad signal, cylinder and other petroleum oils.
Canada Switch & Spring Co., Montreal.—Full size standard truck for open cars, with Meneely bearings, loaded with six tons of rails, equivalent to a full load in service
Carter Brake Co., Chicago, Ill. Semi automatic street car brake.
Chapman Valve & Mfg. Co., Indian Orchard, Mass. Steam valves for power plants.
Chicago Insulated Wire Co., Chicago, Ill. Insulated copper wire and cables and trolley wire.
Coleman Fare Box Co., Tottenham, Ont. Fare register boxes for street cars.
Consolidated Car Heating Co., Albany, N. Y. Electric heating system for street cars.
Crane Co., Chicago, Ill. Brass and iron valves, cocks, gate valves and hydrants
Darling Bros. (Reliance Iron Works), Montreal. Webster vacuum feed water heater and Morse valve reseating machine.
E. F. de Witt & Co., Lansingburg, N. Y. Sand box for electric street cars.
Detrick Life Guard Co., Cleveland, O. Automatic life guard for street cars.
T. Euphret, Darien, Conn. Trolley wheels, ice cutters and harps.
Falk Mfg. Co., Milwaukee, Wis. Cast-welded rail joint; Falk trolley.
Goubert Mfg. Co., New York City. Stratton steam separator and model of the Goubert feed water heater.
Hogan Boiler Co., Watertown, N. Y. Water tube boilers.
H. R. Ives & Co., Montreal. The Himphry street car fender.
A. Jackson Reynolds & Co., Worcester, Mass. New railroad system of street cleaning. Model of car for sweeping street and carting away dirt and snow.
Ed. Julian, Montreal, P. Que. Models of combination car for summer and winter service, combination snow plow and slow sh vel, side guard and paten fender.
Lamb & Chapman, Montreal, P. Que. Automatic portable street car fender and adjustable wheel guard.
Lobdell Car Wheel Co. Wilmington, Del. Two street car wheels in splendid condition after having traveled 112,750 and 117,057 miles respectively.
A. Roy MacDonald, Jr., Montreal. Mica for insulating purposes.
Massachusetts Car Co., Worcester, Mass. Graham's steel frame street car.
McPherson Sand Box Co., Troy, N. Y. The McPherson sand box for street cars.
McGuire Mfg. Co., Chicago, Ill. "Columbia" street car heater.
Mica Insulator Co., New York City, "Micanite" for insulating purposes.
Morris, MacCurdy & Smith, Montreal. Phœnix rubber insulating paint.
Montreal Car Wheel Co., Montreal, P. Que. Thirty-in. 20-lb. and 24-in. 18-lb "machined" street car wheels.
The James Morrison Brass Mfg. Co., Ltd., Toronto, Ont. Brass goods for interior and exterior decorations of cars.
Eugene Munson & Co., New York City. Mica for electrical insulation.
New Haven Car Register Co., New Haven, Conn. Double and triple street car fare registers and polished bronze rod and cord fixtures for same.
New York Car Wheel Wks., Buffalo, N. Y. Thirty-in. 300-lb. and 33-in. 360, 325 and 350-lb. "machined" street motor car wheels.
Peckham Motor, Truck & Wheel Co., Havemeyer Bldg., New York City. Standard extension, "new" Excelsior and extra long extension street car trucks, Wood & Fowler patent track brake, Peckham adjustable life and wheel guard and emergency brake.
George E. Smith, Sherbrooke, P. Que. Machine for bending both steam and street railroad rails.
Sterling Supply & Mfg. Co., New York City. Sterling wheel guard and pick-up fender, fare register, sand box wire measuring machine, winding machine (for recording revolutions of winding spindles, armatures or bobbins) revolution counter for flexible shaft, machine for counting reciprocating or rotary movements, tallying machine and rattan and overhead line materials.
Stever Rail Joint Co., Cleveland, O. Stever joint for T and and chair rails.
Standard Paint Co., New York City. "P. & B." insulating compounds, armature varnish, insulating tape, water, acid and alkali proof ruberoid roofing and roof paints.
St. Thomas Car Wheel Co., St. Thomas, Ont. Thirty-in. 300 lbs. and 33-in. 325 and 350-lb. "machined" street motor car wheels.
D. D. Sweet, Springfield, Mass. Bronze sand and salt box.
Taylor Electric Truck Co., Troy, N. Y. Empire State radial truck, adjustable safeguard and Taylor improved single truck.
Taunton Locomotive & Mfg. Co., Taunton Mass., by Wendell & MacDuffie, New York. Two nose and one share plow and a Taunton street sprinkler in operation on the lines of the Montreal Street Ry. Co. The two last named were illustrated in our issue of Oct. 11, 1895.
Noah L. Piper & Son, Toronto, Ont. Railroad lamps and signals.
United States Projectile Co., Brooklyn, N. Y. Hot press steel motor pinions for all electric systems; trolley poles.
Walker Mfg. Co., Cleveland, O. Electric street railroad motors, switch-boards and various kinds of street railroad appliances.
Wendell & MacDuffie, Havemeyer Bldg., New York Bonta combination brake and fender, as used on the North Hudson County electric road.
Whitfingham Electric Car Heating Co., Baltimore, Md. Electric street-car heater.

TECHNICAL.

Manufacturing and Business.

The Toronto, Hamilton & Buffalo has awarded contracts for the equipment of its lines with interlocking switches and signals to the Auto-Pneumatic Railway Signal Co., of Rochester, N. Y. These signals are now used by the Delaware, Lackawanna & Western, and Western New York & Pennsylvania roads.

The large storehouse at the Bushnel Mfg. Co.'s car seat works, at Easton, Pa., was injured by fire on Oct. 10. The estimated loss on the building and stock is $10,000 covered by insurance.

The Baltimore & Ohio Southwestern has placed large orders for the National railroad foot guard, through their Engineer of Maintenance of Way, Mr. D. D. Carothers.

Contracts for 1,700,000 ft. of Washington fir and for 5,000,000 ft. of white pine as well as for 2,500 piles, have been let by the Duluth, Missabe & Northern for its new ore dock at Duluth.

The New York, New Haven & Hartford has ordered two No. 4 Russell snow plows for use on the Old Colony Division, from the Ensign Manufacturing Co., of Huntington, W. Va.

New Stations and Shops.

The Ohio River road has erected at Point Pleasant, the junction point with the Kanawha & Michigan, a large three-story building to be used as a restaurant, hotel and station. The offices of the company are also located in the building.

The Chesapeake & Ohio will build a new freight station and warehouse at Huntington, W. Va. The contract has been let, and the work of tearing down the old station, the site of which the new building will occupy, has begun. The building will be 50 × 300 ft., of pressed brick, with stone and terra cotta ornamentation.

The Erie has had plans prepared for a brick station at Youngstown, O., to cost $75,000. Work will be commenced next spring.

The plans for the new Union station at Columbus, O., to be built by the Pennsylvania and the Cleveland, Cincinnati, Chicago & St. Louis and other roads, have now, it is announced, been finally approved by officers of all the interested roads.

The Atchison, Topeka & Santa Fe is to build car repair shops at Argentine, Kan. One building, 120 ft. × 280 ft., will be put up now and a car-wheel foundry will be added later. The present roundhouse will be much enlarged.

Iron and Steel.

Press reports say that the puddling mills of the Bethlehem Iron Co. have begun to run double time on both day and night shifts.

The final installment of $20 per share on the reorganized Pennsylvania Steel Co. preferred stock became payable this week. The new certificates of the preferred and common stock will shortly be issued in exchange for the temporary receipts. Interest at the rate of 5 per cent. per annum will be paid on the preferred stock which was paid up in full on June 15 last. Hereafter the preferred stock will participate in the earnings of the company up to 7 per cent.

Crossing Gates.

The Pneumatic Gate Company has just closed a contract with the New York, Chicago & St. Louis Railroad Company for the equipment of 36 crossings in the City of Cleveland, O., with pneumatic gates. This is thought to be about the largest contract for such equipment ever made by any road in this country at one time. It is to be installed in 13 groups, each group to be operated from an elevated tower by the crossing watchman, who will at some points handle as many as four crossings, and never less than two, thus greatly economizing the expense of guarding these crossings while providing them with a much more effective protection than usual. The sale was made to Mr. A. W. Johnston, General Superintendent, and G. W. Vaughan, Engineer, who have had these gates in use at different points on that road for three years.

The Jerome Park Reservoir.

The Ingersoll-Sergeant Drill Co. has received a large order for a complete plant of air compressing machinery for running drills, engines, pumps, etc., on the Jerome Park reservoir work, New York, which involves the removal of upwards of 3,000,000 cubic yards of rock. Mr. John B. McDonald, the contractor, after a careful investigation to determine whether or not the machinery for excavation can best be run by steam or from a central compressed air plant, has adopted the central plant system as the best and cheapest, the saving in expense being largely in labor and fuel. The Ingersoll-Sergeant Drill Co.'s plant, which will be used, involves the use of compound condensing Corliss air compressors, run by boilers transmitting and distributing compressed air at 80 lbs. pressure throughout the work. It is contemplated to use a battery of several air compressors placed side by side, the unit adopted being a Duplex compressor with steam cylinders 24 in. and 44 in. in diameter, stroke 48 in., driving two piston inlet air cylinders, each 24¼ in. in diameter by 48 in. stroke. The capacity in free air of this machine will be between 3,000 and 4,000 cu. ft. per minute. This is a duplicate of compressors at work at the Anaconda mines in Montana, where very economical results have been derived.

THE SCRAP HEAP.

Notes.

The trainmen on the Morris & Essex Division of the Delaware, Lackawanna & Western have been forbidden to supply boards or cards to passengers who play cards on the trains.

A press dispatch from Washington reports Second Assistant Postmaster-General Neilson as saying that no more street railroad mail car routes can be established at present for the reason that the appropriation for the current year has been exhausted.

The Atlanta *Journal* reports that 26 theatrical people were put off from a train of the Southern Railway about 100 miles east of Atlanta a few days ago, because their New York tickets, which had been bought of a scalper in Atlanta, were refused by the conductor.

Press dispatches of Oct. 5 reported that a special train on the Delaware, Lackawanna & Western made very high speed between Corning and Elmira, but the officers of the company do not confirm the statements made, and it looks as though they were exaggerated.

An electric street car was derailed and wrecked in Pittsburgh on Oct. 13, and three of the passengers were killed. Nine others were injured, and the car was completely destroyed. It is stated that a brake rod broke while the car was on a steep grade, and the car became uncontrollable and jumped the track at a sharp curve.

The freight warehouse of the Seaboard Air Line at Portsmouth, Va., was destroyed by fire on the night of Oct. 9, together with a large quantity of freight. The fire was a large one, sweeping over the whole space between Water street and the adjacent wharves, and the total estimated loss was $200,000. The railroad clerks had to jump into the water to save their lives, and one freight house man was drowned.

The fire in the Bozeman tunnel on the Northern Pacific is worse than it was expected to be. The tunnel was sealed up several weeks ago, but the fire was not extinguished, and it is said that oil is now being used to hasten the destruction of the combustible materials in the tunnel. It is stated that there are large quantities of wood above the roof, placed there when the tunnel was made, to fill up spaces caused by cave-ins. This wood is still afire.

The Corporation Counsel of the city of Chicago has announced his intention of pressing city claims against the railroads, amounting to $3,042,403, for their alleged proportion of viaduct damage suits recovered from the city by property owners. The railroads have claims filed against the city aggregating $1,171,157 for damages incurred during the Debs strike, and the corporation counsel apparently hopes to effect a compromise. As there is much more doubt regarding the validity of the claims of the city, viewed from a legal standpoint, than those of the railroads for "riot" damages, the probabilities are that the railroads will, in the end, come out ahead.

The locomotive "General," which distinguished itself on the Western & Atlantic in April, 1862, has had its exploit thoroughly heralded to the world, and its fame is now familiar to every one; but the "Texas," the engine on which the Confederates rode on that eventful day, and which was the victor in the race, has not received its share of attention, and a writer in the Atlanta *Journal* makes a strong plea for the correction of this injustice. The "Texas" is now lying in the locomotive "bone

yard" at Vining, Ga., and is covered with the rust which has resulted from exposure to the rains and suns of four years. The Daughters of the Confederacy tried to have the engine fixed up to exhibit at the Cotton States Exposition, but the officers of the railroad would not comply with their wishes, though they say that they expect to have the engine dressed up so as to be presentable in the near future.

Lake Notes.

The Aurania, a wooden vessel, this week carried from Ashland the largest cargo of ore ever taken from Lake Superior, 3,931 gross, or 4,403 net tons, three tons greater than the same vessel's first cargo taken at Duluth the week before. At $1.40 a ton, the rate paid, the vessel took $5,503 for the load. The Zenith City took 140,000 bushels wheat at Duluth the same day. At five cents a bushel the cargo was worth $7,000.

The rates for freight by lake boats are still advancing. From Escanaba to Lake Erie $1.25 is now paid on ore from Marquette $1.50, and from Duluth $1.75. Wheat, Duluth to Buffalo, is six cents, and corn, Chicago to Buffalo, is four cents, an unprecedented rate. There is likelihood of a still further advance. Large shipments of ore have been contracted for at $2 and the opening rate for next year is guessed at $1.25 which is 45 to 50 cents above last spring. This, notwithstanding the fact that not far from 2,000,000 of new tonnage (seasoned capacity) will be afloat next spring in all probability. Already half that amount has been contracted.

Electric Railroad Construction at Denver.

In Denver, recently, articles of incorporation were filed for the construction of two suburban electric rapid transit lines. The Denver & Southwestern stocked for $100,000 is designed to construct a line to Morrison, a scenic point south of Golden. The Denver, Globeville & Golden Rapid Transit Co designs to connect Globeville, a rich market-garden territory, and Golden with the city tramways. Dr. L. E. Lemen is President of the latter and E. J. Bancroft of the former.

Eighteen Passengers Killed in Belgium.

A press dispatch of Oct. 6 reports a collision between a passenger and a freight train near Ottignies, 18 miles from Brussels, Belgium, in which 18 persons were killed and over 100 injured. At least 25 of the latter are dangerously hurt Three passenger cars were crushed, and it took all night to take out the dead and injured from the wreck. The collision is attributed to the absence of the regular signalman at Ottignies, who had been replaced by an inexperienced man.

The Chicago Union Transfer Railway.

This enterprise, which was organized at Chicago in 1892 by the principal railroads entering that city for the purpose of establishing a large freight yard, with warehouses, about 10 miles southwest of the court house, and a belt railroad about 60 miles long, has lately been revived. It was called the "Stickney scheme," but a dozen of the largest roads entering the city participated in it, and are stockholders in the company; and the committee which has just been appointed to see about resuming active operation consists of Messrs. J. M. Whitman, General Manager of the Chicago & Northwestern; James McCrea, Vice-President of the Pennsylvania lines, and J. T. Harahan, Vice-President of the Illinois Central. They are instructed to employ a civil engineer to survey the large rectangular tract controlled by the company and make a map and estimates for laying out tracks.

A description of the plans of this company, with a map, was printed in the *Railroad Gazette* of Sept. 9, 1892. Their object is to relieve the crowded freight yards and transfer tracks in the thickly settled part of the city. The tract shown on the map, on which it is proposed to build warehouses and yards, is about three miles square, being bounded by Fifty fifth street on the north, Seventy-ninth street on the south and Hyman avenue on the east; but we do not understand that the company owns more than a fourth of this territory..

LOCOMOTIVE BUILDING.

The Ohio River road will buy at least six new engines within the next month. The order has not been placed, but bids will be asked soon.

The Brooks Locomotive Works have just shipped two 10-wheel locomotives to the Mexican Central, these engines being the last of an order for five. The engines are built from the designs of Mr. F. W. Johnstone, Superintendent of Motive Power, and are for passenger and freight service. The cylinders are 20 in. × 24 in.

The Schenectady Locomotive Works have recently furnished the Vandalia Line four 20×24-in. eight-wheel passenger locomotives for use on the heavy fast trains between Indianapolis and St. Louis. The engines weigh about 129,000 lbs. and have exceptionally large boilers, built for carrying 190 lbs. steam pressure. The driving wheels are 73 in. in diameter and the centers are of cast steel. The general design of the engines is similar to the eight-wheel passenger engines recently built at the Schenectady Works for the Boston & Albany.

CAR BUILDING.

The Portland & Rochester will shortly award contracts for building 20 cars.

The Boston & Maine is reported to be in the market for about 1,000 cars of various types.

The New York, Lake Erie & Western has awarded an order for 1,000 cars to the Michigan-Peninsular Car Co.

The New York, New Haven & Hartford this week gave out its order for cars. The number to be built is 1,600 in two lots of 800 cars. The order was divided between the Wason Mfg. Co., the Keith Mfg. Co., and the Osgood Bradley Works. The cars are to be box and side dumping cars.

The St. Charles Car Co. has a contract for building 150 freight cars of miscellaneous types for the National Tehauntepec Railroad. This contract was given last week by Mr. Samuel Hermanos, of New York City, who has the contract for completing the equipment of the National Tehauntepec Railroad.

The New York, Otario & Western this week awarded the contract for building 250 coal cars to the Michigan Peninsular Car Co., of Detroit, the lowest bidder. The order will probably be increased to 275 cars. The cars are to have Westinghouse air-brakes and Gould couplers. The specifications further include Butler drawbar attachments, Schoen pressed steel center plates, stake pockets and angle plates. The oil boxes are to have spring covers, Morris pattern. The wheels are to have the Barr contracting chill. The axles are to be of open hearth steel, Pencoyed or Cambria brand.

BRIDGE BUILDING.

Allegheny, Pa.—The Department of Public Works has received bids for the Woods Run viaduct from Penn Bridge Co., $18,970; Shiffler Bridge Co., $16,920; Youngstown Bridge Co., $16,700, and Pittsburgh Bridge Co., $16,490. The viaduct will be a 22 ft. roadway and two 8-ft. side walks. It will be 700 ft. long.

Annapolis, Md.—Bids will be received until October 22 for an iron bridge to replace the bridge at present crossing Marley Creek, this place. Bids should be sent to A. K. Starlings, Clerk of the Board of County Commissioners.

Baltimore, Md.—The city council met on Oct. 7, and made the following appropriation: For the North avenue bridge, of which all save the western approach is complete, $90,000, the full amount asked by the engineer in charge, was appropriated. Mayor Latrobe sent a recommendation that $2,500 be appropriated for the maintenance of Light street bridge. The matter was referred to the Ways and Means Committee.

Benton Harbor, Mich.—The Big Four road was requested on October 9 by numerous land owners to desist from building a stationary bridge over the Paw Paw River which would permanently obstruct future development of navigation. A swing bridge is desired.

Buffalo, N. Y.—Press reports say that the Porter avenue bridge will be of the arched girder style with ornamental panels on the sides and heavy buttresses at either end surrounded by electrollers. The roadway will be 50 ft. wide and paved with asphalt, and the sidewalks will be 25 ft. wide. They will be of granolithic.

Cincinnati, O.—The County Commissioners on Oct. 5, decided to renew the Spring Grove avenue bridge over Millcreek near Ivorydale at a cost of $46,000. Bonds to that amount were ordered issued and sold in denominations of $500 each and dated Nov. 1, 1895, and payable in seven years after date, with interest payable semi-annually at 4 per cent. per annum.

Detroit, Mich.—The Board of Public Works on Oct. 9 discussed the strengthening of the Porter street bridge so that it will bear the cars of the Detroit Railway that will soon run over it. The bridge is a comparatively new one, but it has wooden beams and they will have to be replaced with steel ones before it becomes strong enough to carry the cars safely. The cost of the steel beams will be about $4,000.

Hoquiam, Wash.—Press reports say that a 125-ft. draw span will be built across the Hoquiam River at this place.

La Salle, Ill.—Mr. J. F. Wallace, Chief Engineer of the Illinois Central, writes concerning the bridge over the Illinois River at this place: "Each year this company does a certain amount of work in the way of replacing old bridges with modern steel structures. In line with this policy the La Salle bridge is now being rebuilt. The total estimated cost of this work, however, is $150,000. This season we are renewing six 160-ft. spans of this bridge, refitting the old spans for use on branch lines. The Chicago Bridge & Iron Works has the contract for this work."

Maquoketa, Ia.—The bids received by the Board of Supervisors of Jackson County for a county bridge at Godard's Mill, in South Fork Township, are as follows: John Anderson, of Fulton, Ia., $695; John Streets, of Monmouth, Ia., $774; Bristol & Widdal, of Monmouth, $825.

McMinnville, Or.—A bridge is to be built across Cozine Creek at this place. Bids have been asked for.

New Milford, Conn.—The Berlin Iron Bridge Co. has just completed a highway bridge over Still River, consisting of one span of 170 ft., with a roadway 20 ft. wide in the clear. The bridge is 105 ft. above the bed of the river.

Norristown, Pa.—The Grand Jury on Oct. 10 approved the report of a jury of view recommending the erection of an iron county bridge, 40 ft. wide and 468 ft. long, ever Stony Creek, to cost about $40,000. The bridge is intended to provide communication between two sections of Norristown other than over the grade crossings of the Reading Railroad.

Philadelphia, Pa.—I. H. Hathaway & Co., of the Girard Building, Philadelphia, have been awarded the contract for the drawbridge on the line of Bridge street over Frankford Creek, at a contract price of $40,370.

Pittsburgh, Pa.—The plans and specifications for the reconstruction of the California avenue bridge in Lower Allegheny, have been finished by Engineer Wilkins, and the contracts for the work awarded. The Keystone Bridge Company will do the structural iron work and Booth & Flinn will have charge of the street work, changing the grade, etc. Work will be started at once and will be finished in January. The present bridge is to be increased in length from 593 to 713 ft., 60-ft. being added to each end. It is not the intention to raise the bridge on its present foundation. The contract provides for an entire new structure to be built over the present one, with a height of 15 ft at the south end and 19 ft. at the north, at an outlay of about $40,000.

Pottsville, Pa.—The contracts for the three bridges for which the County Commissioners received bids up to Oct. 7 were let as follows: For the stone bridge at Tamaqua the contract was let to Philip Keller, of Tamaqua, at $4,905; for the iron bridges at Pine Grove and at Ashland the contracts were both awarded to the Horseheads Bridge Co., of Horseheads, N. Y., the prices being $1,170 and $1,764 respectively.

Santa Rosa, Cal.—A bridge is to be built across San Antonio Creek, on the boundary line between Sonoma and Marin counties.

Sioux City, Ia.—The City Council met on Oct. 7, and it was settled that the approach to the Pacific Short Line bridge should be built to West Third street. The approach will have a 32-ft. driveway and an 8-ft. sidewalk. The city engineer was instructed to report on the expense of widening the street along the route of the approach to 80 ft. The contract for the construction of the approaches has been let by the Combination Bridge Company to Sooysmith & Co., of New York, the firm which is building the substructure.

Toledo, O.—The work of driving piles for the south end of the Perry street bridge was commenced to-day. A dredge will soon be set to work on the new channel made necessary. The contract provides that the new bridge shall be ready for travel by Dec. 1.

Wabash, Ind.—The County Commissioners of Wabash County have let the contract for a 380-ft. plate girder bridge over the Wabash River at this place to the Wabash Bridge Co. The bridge will be 52 ft. wide, and, including substructure, will cost $32,000.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cincinnati, Sandusky & Cleveland, semi-annual, 3 per cent. on the preferred stock, payable Nov. 1.

Freehold & Jamesburg Agricultural, 3 per cent., payable Oct. 18.

Long Island, quarterly, 1 per cent. on the capital stock, payable Nov. 1.

Toledo & Ohio Central, 1¼ per cent., on the preferred stock. payable Oct. 25.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central Massachusetts, annual, Oct. 30.

Chesapeake & Ohio, annual, Richmond. Va., Oct. 22.

Cleveland, Cincinnati, Chicago & St. Louis, annual, Cincinnati, O., Oct. 30.

Illinois Central, special, Chicago, Nov. 26 to authorize a capital of $10,000,000 for the capital stock.

Manhattan Railway Company, annual, New York City, Nov. 13.

Manitou & Pike's Peak, annual, Manitou, El Paso County, Col., Oct. 19.

Newburgh, Dutchess & Connecticut, annual, Matteawan, N. Y., Oct. 31.

New Orleans & North Eastern, annual, New Orleans, Nov. 6.

St. Louis & San Francisco, annual, St. Louis, Mo., Oct. 29.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Engineers' and Architects' Association of Southern California meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The Engineers' Society of Western New York holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Westevan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville. Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at . p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall, Ithaca, N. Y.

Canadian Society of Civil Engineers.

A regular meeting was held at Society's rooms, Thursday, Oct. 10, 1895. A paper entitled A Few Questions on Railway Work, was read by Mr. J. G. Kerry, A. M., Can. Soc. C. E.

American Institute of Electrical Engineers

A meeting of the Institute will be held on Wednesday, Oct. 23, 8 p. m., at 12 West Thirty-first street, New York City. A paper will be presented by Mr. Hermann Lemp, Jr., of Lynn, Mass., on the Local Annealing of Hard Faced Armor Plates. A paper will also be presented by Prof. W. M. Stine, of Chicago, on The Rating and Behavior of Fuse Wires. A meeting of Western members will be held the same evening, Wednesday, Oct. 23, 8 p. m., in the rooms of the Western Society of Engineers, 1737 Monadnock Building, Chicago.

The Civil Engineers' Society of St. Paul, Minn.

A regular meeting of the Civil Enginners' Society was held Oct. 7. Vice-President Hilgard presided, 14 members and 11 visitors were present. Mr. Hew Miller was elected to membership Mr. A. O. Powell read an interesting and fully illustrated paper on Sluice Gates and Movable Dams of the Bear-Trap Type.

The bear-trap gate is an American device of 80 years ago, but lately modified and improved. The French condemned it after an experimental trial of a gate wrongly proportioned, apparently considering it unworthy of scientific study. Mr. Powell has investigated the bear-trap gate mathematically and will prepare his paper for publication in the journal of the Association.

Mr. R. A. Lang, of Eau Claire, Wis., a builder and inventor of bear-trap gates of 18 years' experience, briefly touched on a few points of interest.

Master Car Builders' Association.

The secretary has issued the following circular: The thirtieth annual convention of the Master Car Builders' Association will be held at Saratoga, N. Y., commencing on Wednesday, June 17, 1896, which is one week later than the date prescribed by the Bye-Laws. This change is made after consultation with the Executive Committee of the American Railway Master Mechanics' Association and the unanimous vote of the Executive Committees of both Associations in favor thereof. Headquarters will be at Congress Hall, which has made the following terms:

Single rooms	$3.00 per day.
Double rooms, one person	4.00 " "
Double rooms, two persons (each)	3.00 " "

These rates are for members of the Association and their friends.

Members of the Association will have preference of rooms until March 1, 1896. Application for rooms should be made to H. S. Clement, Manager, Congress Hall, Saratoga, N. Y., and the Committee of Arrangements requests that members should apply at once for rooms, as those who first apply will be best served.

Messrs. Jno. S. Lentz, S. A. Crone and J. W. Marden represent the Association on the Joint Committee of Arrangements.

American Society of Civil Engineers.

At the meeting of October 2 E. C. Moore, Jun. Am. Soc. C. E., presented his paper on "Moving Two 36-In. Water Mains Without Shutting Off the Water," which was discussed by Messrs. H. W. Brinckerhoff, Wegmann, Platt, Owen and the author.

Mr. Howard Constable, M. Am. Soc. C. E., presented a number of photographs of the Ireland Building in New York, which recently failed during construction, and an informal discussion of this disaster and of the New York building laws followed.

On Wednesday, Oct. 16, 1895, Thomas C. Clarke, M. Am. Soc. C. E., presented a paper on "Effect of Depth on Artificial Waterways" (abstract in *Railroad Gazette* Oct 4).

A paper by William Starling, M. Am. Soc. C. E., on "The Discharge of the Mississippi River," will be presented on the evening of Wednesday, Nov. 6, 1895, an abstract was published by us Oct. 4.

Following are the nominees for the offices to be filled Jan. 15, 1895, as published in the *Railroad Gazette* Oct. 4.

President.—Thomas Curtis Clarke, New York City.

Vice-Presidents.—William Rich Hutton, New York City, and Peter Alexander Peterson, Montreal, Can.

Treasurer.—John Thomson, New York city.

Directors.—George Alexander Just, New York City; William Barclay Parsons, New York City; Horace See, New York City; John Ripley Freeman, Boston, Mass.; Daniel Bontecou, Kansas City, Mo.; Thomas William Symons, Portland, Or.

The Secretary announced the following deaths: Orlando M. Poe, Colonel Corps of Engineers and Brevet Brigadier-General, U. S. A. Elected member Jan. 8, 1873; died Oct. 2, 1895. Pomeroy P. Dickinson, elected member Jan. 17, 1872; died Oct. 4, 1895.

The Railway Signaling Club

A regular meeting of The Railway Signaling Club was held Oct. 8, at the Great Northern Hotel, Chicago. After disposing of a few matters of business a communication from Mr. Charles Hansel was read in which some points in the paper by Mr. W. J. Gillingham, read at the previous meeting, were discussed. This paper was entitled "Safe Speeds at Interlocking Plants," and was reported in the *Railroad Gazette* of June 28. Mr. Hansel did not consider distant signals as being necessary at all interlocking plants in cities. Local conditions sometimes render them of little value. Accidents were quoted which had followed careless use of distant signals. The cost of installing electric locks is so low that they should be required at all points where high speeds are allowed and distant signals are put in. Attention was called to the increase of the speeds of trains since the distances of derails and signals from crossings were established and the opinion was expressed that distances of from 300 to 500 ft. were insufficient to insure the stopping of trains which might be run off of derails upon hard or frozen ground. Mr. Hansel's suggestion for the solution of the distant signal problem was to make them stop signals and establish a rule which would permit trains which had been stopped by them to proceed toward the home signal as far as the way was known to be clear.

The paper for the evening was by Mr. H. D. Miles, Signal Engineer of the Michigan Central, entitled "Some Features of Interlocking Construction on the Michigan Central." The contrast between the attention given machine and outside locking was pointed out with a plan for improvement of the latter. This was thought specially necessary on account of well known defects in switch and lock movements. The practice on the road mentioned was to bolt lock all facing point switches with home and distant signals where possible, even though already locked by facing point locks. Drawings of the bolt locks to accomplish this were shown, Illustrations were also shown of a spring centering device for switches, two designs of tubular iron semaphore poles and a method of manufacturing lead out and carrier foundations of concrete. The experiments made by the author on the strength of galvanized pipe were described. A discussion of the report of the Committee on Rules for the Guidance of Levermen occupied the remainder of the meeting.

PERSONAL.

—Mr. F. D. Thompson has been appointed Master of Machinery of the Monongahela Connecting road, vice Mr. W. R. Nicholson.

—Mr. Robert I. Cheatham, of Durham, N. C., has been appointed Assistant General Freight Agent of the Seaboard & Roanoke, to succeed Mr. O'Dwyer.

—Mr. E. W. Cook has been appointed Assistant General Passenger Agent of the New York, Lake Erie & Western, with headquarters in New York City.

—Mr. George B. Beale has been appointed Assistant Engineer of the Pennsylvania at Harrisburg, and Mr. Jesse Baker has been appointed Assistant Engineer of the Philadelphia & Erie Division.

—Mr. R. D. Berrey has been appointed Assistant General Freight Agent of the Houston & Texas Central road, with headquarters at Dallas, Tex. He has been Agent for the company at Dallas for a number of years.

—Colonel William L. Chase, a well-known business man of Boston, and a director of the Fitchburg road, the Boston Wharf Co., and many financial and manufacturing companies, died at his home near Boston on Oct. 7.

—Mr. William P. McElroy, who has held the office of Purchasing Agent of the Denver & Rio Grande road, has resigned. The position has been abolished, Mr. Welby, General Superintendent, assuming the direct charge of the purchasing department.

—Mr. W. W. Kent has accepted his election as Chairman of the newly organized Southwestern Passenger Committee and is now in charge of the office of the company, having resigned his former position of General Passenger Agent of the Chicago, Peoria & St. Louis road.

—Mr. C. A. Hammond, Secretary of the American Society of Railroad Superintendents, has been appointed General Manager of an electric railroad system at Asbury Park, N. J. The name of the operating company is the Atlantic Coast Electric Railway. About 11 miles are finished, or nearly so, and will be ready for operation very shortly. Extensions of the system are probable.

—Col. George H. Mendell, Corps of Engineers, U. S. A., was retired for age last Saturday. During the war Colonel Mendell was brevetted Lieutenant-Colonel and Colonel for gallant and meritorious services, and since the war has done important engineering duties. Latterly he has been in charge of the United States engineering work on the Pacific coast, having special charge of works of defense and of San Francisco Harbor and adjacent waters, and having served on the Commission to regulate hydraulic mining in the State of California.

—Mr. L. Rush Brockenbrough, Traffic Manager of the Ohio Southern and the Cleveland, Akron & Columbus, has resigned his office with the latter company. Mr. Brockenbrough was one of the officers of the Cleveland, Akron & Columbus, whose authority was extended over the Ohio Southern when Mr. G. W. Saul, President of the former company, became Receiver of the latter road. Upon the resignation of Mr. Saul as Receiver of the Ohio Southern, the Cleveland, Akron & Columbus officers resigned also, but it appears that Mr. Brockenbrough continues with the Ohio Southern, giving up his office with the Cleveland, Akron & Columbus.

—Mr. L. S. Robertson, Superintendent of the Memphis Line of the Louisville & Nashville, has had the Clarksville & Princeton and the Clarksville Mineral branches, both in Tennessee, added to his jurisdiction. His division has heretofore extended from Memphis to Bowling Green and these branches add 72 miles to the road under his charge. Mr. Seeley Dunn who has heretofore been Division Superintendent of these branches, will be made Trainmaster of the division, his authority as such including these two branches and a large part of the Memphis line. The consolidation of the two divisions under one superintendent was made merely as a matter of economy.

—Mr. Charles M. Hays, Vice-President and Gen ral Manager of the Wabash, has been appointed General Manager of the Grand Trunk road Mr. L. J. Seargeant, whom he succeeds, has held that office since the resignation of Sir Joseph Hickson in 1891. Mr. Seargeant remains with the company, President Wilson having offered him a highly honorable and complimentary office. His duties will be of an advisory nature to the directors and it is understood that he will remove to London. He has a knowledge of Grand Trunk affairs and of the conditions under which it has to be operated which will be of great value in such an office. Mr. Hays has been General Manager of the Wabash since 1887. He is now about 40 years old. He has been employed in railroading since he was a very young man, and he has served in the passenger, auditing and operating departing departments of Western roads. He was Secretary to the General Manager of the Missouri Pacific between 1877 and 1884, going then to the Wabash in a similar capacity. He was promoted to be Assistant General Manager in 1886 and to be General Manager in the following year.

—Mr. Willard S. Pope, President of the Detroit Bridge & Iron Works, a bridge engineer of high reputation, died at his home in Detroit on Oct. 10. Mr. Pope had been the Manager of the Detroit Bridge Works since 1866, when he became a partner in the concern, which was not then incorporated. He was a man of great industry, and his management of the bridge works was always marked by engineering skill and excellent business judgment. He was educated as a lawyer, graduating from Hamilton College in New York in a class which contained many men who have since become distinguished. Ill-health prevented his following the profession for which he has been educated, and he then determined to take up engineering as a life work. He went West and secured employment as an engineer on the Illinois Central. He was afterward on the Chicago & Northwestern. He left railroad employment in 1866, having purchased an interest in the Detroit Bridge Works, of which he was President at his death. Mr. Pope was a man of culture and literary taste, and occasionally contributed articles to the local journals, generally impressions of travel.

—Mr. Franklin Leonard Pope, the well-known electrician, was accidentally killed by electricity on Oct. 13, at his home in Great Barrington, Mass., where he had lived for the past year. Mr. Pope was born in Great Barrington in 1840, and, with his brothers, came to New York about 1860, and he was one of the pioneers in electrical study and engineering. He became a telegraph operator before he left New England, and grew up with the telegraph both as an art and as a business, always holding an advanced position. He never waited for the business to teach him what to do; he was a leader. In 1865 he took part in the survey for the proposed telegraph line to Behring Straits.

Mr. Pope was the inventor of important devices in connection with the printing telegraph and figures in some of the earliest patents concerning automatic block signals for railroads. His inventions naturally led him into the patent field and he became a patent solicitor and was for several years Patent Attorney for the Western Union Telegraph Company. He was an accomplished writer and had made important historical studies in the telegraphic field. His best known work is the Modern Practice of the Electric Telegraph, which was first issued in 1872 and was revised and enlarged in 1891. This work, although of somewhat limited scope, is most thorough and comprehensive and really constitutes a monument to the author. His style is expressive and charming, so that he makes even dry details attractive, and, at the same time, every paragraph is characterized by precision and scientific accuracy.

Mr. Pope was the second President of the American Institute of Electrical Engineers; the present Secretary of the Institute, Mr. Ralph W. Pope, is his brother. The deceased leaves a widow, two daughters and one son. He was as amiable personally as he was able in his professional field; and he was not only learned, but was singularly wise.

ELECTIONS AND APPOINTMENTS.

Akron & Pittsburg.—This company has been incorporated in Ohio by Col. A. L. Conger, K. B. Conger, John C. Frank, J. W. Holloway and John H. Sample, of Akron, O.

Alabama Great Southern.—H. F. Smith, General Freight Agent, announces that the office of General Eastern Agent of the Queen & Crescent has been abolished. This position was held by J. W. Mengies, with headquarters in New York. The duties of the office will be performed by William Mauge, Traveling Freight and Passenger Agent, headquarters 343 Broadway, New York. The office of Commercial Agent at Richmond, Va., has also been abolished.

Atchison, Stockton & Denver.—The directors held a meeting in Atchison, Kan., last week, to complete the organization of the company. The following officers were elected: A. J. Harwi, of Atchison, President; W. B. Ham, of Stockton, and A. J. Felt, of Atchison, Vice Presidents; F. T. Burnham, of Beloit, Secretary, and W. H. Caldwell, of Beloit, Treasurer.

Bloomington.—This company has been organized in Wisconsin as noted last week. The names of the incorporators are A. C. Tubbs, Grant Ballantine, A. J. Frazier, W. H. Glasier, Lincoln Abraham, A. N. Hoskins, H. E. Tyler, S. E. Kitte, D. F. Brown, L. D. Huford, M. F. Woodhouse, William Leighton, John Jeide, of Bloomington, Wis.

Boston & Maine.—At the annual meeting of the stockholders at Lawrence, Mass., Oct. 9, the following Directors were elected: Lucius Tuttle, Boston; Samuel C. Lawrence, Medford, Mass.; J. S. Ricker, Portland, Me.; George M. Pullman, Chicago; Richard Olney, Boston; William T. Hart, Boston; A. W. Sullaway, Franklin, N. H.; J. H. White, Brookline, Mass.; W. Hallowell, Wellesley, Mass.; H. R. Reed, Boston; Artus Block, Manchester, N. H.; Lewis C. Ledgar, New York; H. M. Whitney, Brookline, Mass.; P. S. Dinnock, New York; W. Whitney, Holyoke, Mass., and J. A. Hall, Springfield, Mass.

Cincinnati, Hamilton & Dayton. — At the annual meeting last week the directors elected at the time of the consolidation this year were re-elected as follows: Henry F. Shoemaker, Wilberforce Sully, Rush Taggert, Fellowes Davis, New York; Mahlon C. Martin, New Brunswick; John H. Taylor, Milford, Conn.; George W. Davis, Toledo; Robert C. Schenck, Dayton; M. D. Woodford, Eugene Zimmerman, Lawrence Maxwell, Jr., F. H. Short, George H. Balch, Cincinnati. A meeting of the directors will be held this week for organization.

Cincinnati, New Orleans & Texas Pacific.—Mr. J. P. McCuen has been appointed Superintendent of Motive Power, and will have general supervision of the motive power department as far as may be necessary to insure uniform practice. Receiver S. M. Felton describes his duties as follows: No new work or important repairs will be undertaken except upon plans furnished by him, and he will direct, from time to time, the way in which current repairs shall be made, with a view to conforming to the standards adopted. He will have general supervision over the car inspection. He will keep a record of the numbers and conditions of all locomotives, cars and machinery, owned or leased by the company; will keep in his office a record of patents owned or purchased; will keep a full record of supplies on hand in the motive power department, and will be required to approve all requisitions for material and supplies after their approval by the superintendents, in order that he may exercise a general control over the distribution of material from various points on the line, and be able to see that orders are limited to actual necessities. In addition to his duties as Superintendent of Motive Power, he will also act as Master Mechanic of the Cincinnati division in charge of the shops at Ludlow, Ky.

Cumberland Valley.—The annual meeting of the stockholders was held last week at Harrisburg, Pa. The present Directors were re-elected, as follows: President, Thomas B. Kennedy; George B. Roberts, A. J. Cassatt, John P. Green, Henry D. Welsh and John N. Hutchison, of Philadelphia; John Stewart, M. C. Kennedy, Thomas B. Kennedy, of Chambersburg; Spencer C. Gilbert, of Harrisburg, and J. Herman Bosler, Edward B. Watts, of Carlisle.

Monterey & Mexican Gulf.—Arthur Monnom, representative of the Belgian interests now controlling this road, will operate it as General Manager. He announces the following appointments: William McKenzie, Chief of Traffic and Transportation; H. Nollan, Chief of Motive Power and Roadways; J. Boullon, Auditor; A. Chevalier, cashier; F. Martinez, Chief Surgeon. The office of General Superintendent has been abolished.

New York, Texas & Mexican.—The Directors of the New York, Texas & Mexican, and Gulf, Western Texas & Pacific road, held a special meeting at Victoria, Tex., Oct. 6, at which the resignation of W. S. Hoskins was accepted and D. T. Forbes was elected to succeed him as Vice-President and Director. W. G. Van Vleck was elected President, vice J. Kruttschnitt. The road is a division of the Southern Pacific, and its officers are connected with that company.

Pennsylvania.—George B. Beale has been appointed Assistant Engineer of the Middle Division, vice W. B. McCaleb, promoted, and J. B. Baker, Jr., has been made Assistant Engineer of the Middle Division of the Philadelphia & Erie Division, to succeed George B. Beale, transferred.

Salt Lake & Los Angeles.—The stockholders held their annual meeting last week at Salt Lake City, and elected the following directors: George Q. Cannon, Wilford Woodruff, Joseph F. Smith, Nelphi W. Clayton and James Jack. Later the directors elected George Q. Cannon, President; Joseph F. Smith, Vice-President; Nelphi W. Clayton, Manager, and I. A. Clayton, Secretary and Treasurer.

South Brooklyn Railroad & Terminal Co.—John W. Ambrose was elected President; Joseph Richardson, Vice-President; W. Bayard Cutting, Treasurer; and Francis H. Bergen Secretary of this company in New York last week.

St. Paul & Duluth.—The terms of the following directors expired with this year: C. S. Day, New York; J. Smith, Jr., St. Paul; A. H. Stevens, New York. They were re-elected at the annual meeting at St. Paul on Oct. 11. The directors re-elected the old officers.

Vicksburg, Shreveport & Pacific.—President C. C. Harvey and John F. Winslow, of New York City, representing the stockholders, met at Monroe, La., Oct. 7, and elected the following Board of Directors: E. R. Bacon, F. S. Bond, D. Graff, C. C. Harvey, W. I. Jarvis, F. L. Maxwell, Charles Schiff and George C. Waddill. The Alabama & Vicksburg, the Vicksburg, Shreveport & Pacific and the New Orleans & Northeastern will hereafter be operated separately from the other roads formerly comprising the Queen & Crescent Lines.

Washington & Cannonsburg.—The directors of this new company are: Francis J. Torrance, William Beal and Arthur Kennedy, of Allegheny, Pa., Thos. B. Hutchinson and L. H. Mathews, of Pittsburg, Pa., and Marshall H. Kerr, of Ben Avon, Pa. Mr. Kennedy is President.

West Virginia Central & Pittsburg.—At a meeting of the stockholders, held last week, the following were elected directors: Henry G. Davis, Thomas B. Davis, W. H. Gorman, Stephen B. Elkins, G. C. Wilkins, C. M. Hendley, R. D. Barclay and W. J. Reade. The directors elected Henry G. Davis President, Thomas B. Davis Vice-President and C. M. Hendley Secretary. The same directors and officers were elected for the Piedmont & Cumberland, the road being leased by the West Virginia Central and Pittsburg.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Akron & Pittsburgh.—This company has been recently incorporated in Ohio by A. L. Conger, John H. Sample, of Akron, O., and others, to build from Akron through the eastern counties of Ohio to Newcastle and Pittsburg, Pa. Mr. Sample is General Superintendent of the Northern Ohio road, formerly called the Pittsburgh, Akron & Western. The present project is not a new one, but is a revival of the idea of the projectors of the Pittsburgh, Akron & Western to extend that line into Newcastle and the region about Pittsburgh. The distance is about 70 miles, and some little grading east of Akron was completed before the financial difficulties overcame the Pittsburgh, Akron & Western.

Aransas Pass Terminal.—Final surveys were commenced last week on the double-track terminal road from Aransas Pass, Tex., to the deep water dockage front on Harbor Island. The road will be placed under construction as soon as bids can be obtained. It is six miles long, and half the embankment was thrown up three years ago. It crosses a ship channel, which will be spanned by a steel drawbridge.

Atchison, Stockton & Denver.—This company has been organized at Stockton and Atchison, Kan., to build an extension of the Central Branch of the Missouri Pacific from Stockton to a connection with the Union Pacific road at the station of Bogue. The organization is a local one, and the names of officers are given in another column. Committees have been appointed to secure the right of way through Rooks and Graham counties, and it is believed that the right of way will be donated to the committees.

Baltimore & Ohio.—The District of Columbia Commissioners have granted a permit to the Georgetown Barge, Dock & Elevated Railroad Co. to build another track along Water street, in Washington, running from a point on the west side of the Aqueduct bridge to the eastern terminus of the street at Rock Creek. This action will result in giving the Baltimore & Ohio Railroad entrance to Georgetown, and make possible important southern connections.

Belington & Little Laurel.—The contracts for the ties and grading of this road have been let, and work will soon commence. The road is to extend from Belington, W. Va., to a point on the Charleston & Roaring Creek road, near where it connects with the West Virginia Central & Pittsburgh, and will use the tracks of that road to Alexander. The road is about 10 miles in length, and is to open timber and coal lands.

Buffalo, Attica & Arcade.—The standard gaging of this road in New York, which has been going on for some time, has been completed, and the line has been opened its entire length as a standard gage road. It extends from Attica south to Arcade, N. Y., a distance of 15 miles. The old narrow gage property was purchased by Mr. S. S. Bullis, of Olean, N. Y., who has been interested in lumbering in New York, and the improvements have been made under his direction. G. W. Conklin, of Attica, N. Y., is General Superintendent of the road at present.

Butte, Boise & San Francisco.—The officers of this company, which filed articles of incorporation in Wyoming recently, state that contracts for construction will be let within 60 days for most of the line already surveyed. The capital stock is placed at $30,000,000, one-third of which, it is also said, has been underwritten in New York City. H. C. Woodworth & Sons, of Denver, seem to be the promoters of the scheme. The route of the proposed line is from Butte, via Boise, Caldwell, De Lamar, Silver City and through the Beckwith Pass to Sacramento. Some surveys have been made and 30 miles of grade completed from Boise to Caldwell to hold a right of way. Besides new mineral country, heretofore valueless because of distance from railroads, which will be opened up by this new line, much agricultural country will be made accessible to markets. Forests of white pine are passed by the proposed railroad. Among the people interested in this new company are J. M. Clark, of Boston; H. H. Daniels, H. C. and H. A. Woodworth, Denver; Mayor Sutro, San Francisco, and E. M. Dickey. These names are given by the projectors. Mr. Voorhees, of the Philadelphia & Reading, is also mentioned as being interested in the project, but we know that the use of his name is unauthorized.

Carthage & Adirondack.—The branch westward from Benson Mines, which was placed under construction early in the year, has now been opened for traffic. This line is about 3½ miles long and ends at Newton Falls.

Coast Railway of Nova Scotia.—The company is making rapid progress with its work on that portion of the line between Yarmouth and Pubnico, N. S. About 1,200 tons of steel rails were landed at Yarmouth last week by steamer, from Charles Cammell & Co., manufacturers, England. About 20,000 ties have been delivered by Warren Taylor, of Salisbury, N. B., and 20,000 more are to be delivered in the next two weeks. The rail is 56-lb. section, and angle bars and bolts have been ordered from the Nova Scotia Steel Co., of New Glasgow, N. S., and from the St. John Bolt & Nut Works, of St. John, N. B. The fencing for 25 miles has been let to Strathy & Co., of Montreal, to be completed by Dec. 15. Tracklaying and ballasting have been let to H. Townsend & Co., of New Glasgow, N. S., for 30 miles, and the firm has nearly completed the masonry contract for that distance. Five spans of steel plate girder were shipped from the Central Bridge & Engineering Co., of Peterborough, Ont., on Oct. 2, and will be put in place before the end of this month over the Salmon River. Two spans of lattice truss and three plate girders will be shipped from the same works this week for Tusket River. Station contracts have been let to Curry Bros. & Bent, of Bridgetown N. S. Frogs have been bought from John Stewart, of New Glasgow, N. S. It is the intention of the company to put in operation about 15 miles by the middle of December, and to open the road to Pubnico, 30 miles, by May 1 next. The grading is completed to Lower Argyle, 25 miles. This road is being built by the Nova Scotia Development Co., of which J. G. Brill, of Philadelphia, is President; L. H. Wheaton is Chief Engineer of the railroad and in charge of construction.

Columbus, Huntington & Guyandotte.—President Caldwell, of this company, returned to his home in Huntington, W. Va., from New York last Friday, and reports that matters are in such shape that the road is now in fair way to be built. The several counties in West Virginia through which the road is to pass have each made a subscription to the capital stock, and New York capital has been interested to sufficient extent to warrant the assertion that the contracts for building the road will be let this winter. A company has been organized in Jersey City, known as the Guyandotte Construction Co. to build the road. A meeting of those interested will be held in Huntington in a few days to take definite action. The preliminary surveys are about completed, and the engineers will commence the location this month.

Denver & Colorado Southern.—This railroad was incorporated at Denver, Col., on Oct. 13, with a capital fixed at $1,000,000. Eben Smith, S. W. Dorsey, R. H. Reid, J. C. Montgomery, and James E. Gregg are named as the directors. This company will take the route of the Acequia cut-off, by way of the Platte Cañon, and has for its objective point the gold camp of Cripple Creek.

Depew & Tonawanda.—The active work of the construction on this road is now fairly under way and is making good progress. This road is the new Lehigh Valley line from Depew to Tonawanda, which will enable the company to reach the Suspension Bridge over its own tracks instead of those of the New York Central.

Duluth & Iron Range.—A branch from Winsted, Minn., east of Virginia, south to Eveleth, Minn., a distance of about five miles, has just been opened for traffic. This is a branch of the line through the Mesaba iron region.

Duluth, Mississippi River & Northern.—This company is now running its trains into Mahoning and Hibbing, in the Mesaba region in Northern Minnesota. The town of Hibbing is about 37 miles north of the Swan River, the southern terminus of the road. The road was built chiefly for lumbering operations, but was substantially constructed and has now been opened for general traffic.

Georgia & Alabama.—Engineers are to take the field in a short time to survey the proposed extension from Lyons east to Savannah, Ga. In the reorganization of the Savannah, Americus & Montgomery this extension is provided for, and some surveys have already been made for the work. The building of the extension will give the road an outlet to the seaboard. At present the Central of Georgia is used for a Savannah entrance from Lyons, the present terminus of the company's road.

Gulf & Interstate.—The tracklaying on this line, which is being constructed in Eastern Texas, has been interfered with a good deal, from one cause or another, so that although the grading on the present section is all completed and the tracklaying was begun in August with a tracklaying machine, so far only about 31 miles of line has been completed west of Beaumont, Tex. The bridge work on the first section to the Taylor's Bayou, which has been one considerable cause of delay, is now finished and the present terminus of the track is at Winnie, 30 miles west of the Sabine River, on which Beaumont is located. There are only a few trestles between Taylor's Bayou and Point Bolivar, the terminus of the road opposite Galveston, Tex., so that the work here will be completed without further delay and the road opened for traffic about Nov. 15. Cars have been ordered from the Pullman Car Co., and two engines have also been bought.

Kelly's Creek.—This road, built to furnish an outlet to a number of coal mines on Kelly's Creek, in Kanawha County, W. Va., has been put into operation. The terminus is at Cedar Grove, W. Va., and from there, where it connects with the Kanawha & Michigan, it extends along the creek bank five miles. Five mines have been opened along the line, and others are to be opened as soon as there is demand for the product. Each of these mines has two spur tracks from the main line of the road, one connecting with the tipples on the Kanawha River, and the other with the Kanawha & Michigan road, giving the mines outlets both by rail and water.

Leavenworth & Excelsior Springs.—The preliminary survey of the road has been completed from Leavenworth to Mosby, a station five miles south of Excelsior Springs, Mo., on the Chicago, Milwaukee & St. Paul.

New York & Pennsylvania.—The projectors of this road appeared before the State Railroad Commission in Albany this week in favor of the application of the company for permission to construct its road. It will be 39 miles in length, from Hornellsville to Genesee Forks, on the Pennsylvania state line, connecting there with the Olean, Oswayo & Eastern, which reaches the lumber regions in Northern Pennsylvania. Decision was reserved.

Norfolk & Western.—It is announced, though not authoritatively, that this company has let the contract for the building of a short branch line from a point near where that road leaves the Twelve Pole River, to cross Hatfield Mountain, up the valley of Twelve Pole. The new line is to reach timber and coal lands, which, it is said the owners have agreed to develop as soon as the railroad furnishes an outlet. It is also said the contract has been let to S. Walton, of Falls Mills, Va., at $200,000 for 11 miles of road.

Pennsylvania.—Early next week the company will award the contract for the construction of a portion of the Bustleton Branch, near Philadelphia. Only three miles is to be built this year, but it is thought that the road will be completed and in operation by the end of next year.

Stockton & Lodi Terminal.—The grading on this road at Stockton, Cal., will be completed this week, and the projectors announce that they will begin track-laying in a short time. The length of the road from the city to Lodi is only 16 miles, but the line will, when completed, open a San Francisco market to the fruit and vegetable growers along the line.

Terminal Railway of Buffalo.—This company has won in the suit brought against it by the Depew & Southwestern, which sought to prevent it from condemning right of way or taking any other action toward building its road. The history of the two companies has been told so recently as to be very familiar. The Terminal Railway is a project of the New York Central, and is to be a belt line from the town of Depew to Blaisdell, connecting with the New York Central road at Depew, and with the Lake Shore & Michigan Southern at Blaisdell, forming a belt line over which through cars can be run without going through the crowded part of Buffalo. The Depew & Southwestern is a Lehigh Valley project organized within a few days of the organization of the Terminal Railway. Its attorneys disputed the legality of the order of the New York State Railroad Commissioners granting the Terminal Railway authority to build between these two points, and then brought suits to prevent any active construction work. Judge Green, in the Supreme Court at Buffalo, has decided that the Depew & Southwestern has no legal right to bring suit or to interfere with the Terminal Railway building its road. The attorneys of the latter company will carry the litigation to the State Supreme Court.

Terre Haute & Mississippi River.—This company proposes to build a road from Terre Haute to a point on the Wabash River in Sullivan County, Ind., and filed articles of incorporation in Indiana last week. The road is to be 28 miles long.

Washington & Canonsburg.—This company was incorporated Oct. 14, to construct a road from Washington, Pa., to Canonsburg, Washington County, Pa. The capital stock is $70,000. The road will be seven miles long. Arthur Kennedy, of Allegheny City, Pa., is President.

West Virginia Central & Pittsburg.—This company last week sent a party of engineers from Elkins, W. Va., under Chief Engineer Wier, to locate a road from Elkins to Gladys Fork River. The line has been under contemplation for some time, and at one time bids for building a part of it were asked. The territory likely to be traversed is rich in timber and coal.

West Virginia Northern.—The corporate name of the Tunnelton, Kingwood & Fairchance road, extending from Tunnelton to Kingwood, Preston County, W. Va., has been changed to the West Virginia Northern. The road has been changed from a narrow to a standard gage, nearly all the way, and will be completed throughout within a few days. President George Sturgiss and General Manager Ami Martin, last week purchased in Philadelphia new rolling stock, including four locomotive cars for four passenger trains, and a number of freight cars of various types. Other second-hand locomotives will be purchased. The standard gage track is completed from Tunnelton to Howesville, and in a few days the work will be completed on the remainder of the line. It is the intention of the company, and is a part of the contract under which a controlling interest was bought last summer from the local stockholders, that the road is to be continued by way of the Deckers Creek valley, to Morgantown, W. Va., within two years. Work on this part of the road will not likely be commenced before spring.

Wheeling Bridge & Terminal.—All differences between this company and the property holders of Benwood, through which town the company has been trying for two years to get a right of way, have been adjusted, and the work on the extension is now well along, following the original route surveyed two years ago. The extension will reach numerous factories and heavy shippers.

Wheeling & Connellsville.—This company was chartered by local business men and manufacturers in Wheeling, W. Va., several years ago, to build a line from Connellsville, Pa., to Wheeling, with a view to securing a short and independent route for coke shipments to Wheeling furnaces and mills, and to open to Wheeling merchants the territory through which it was to pass. The surveys were partly made for the line, when the financial troubles of 1893 put a stop to all work. The Wheeling Chamber of Commerce last week appointed a committee to see if the project could be revived. This committee in one day secured $5,000 for immediate use in securing a new charter, etc. The President of the old corporation was W. A. Lynch, of Canton, O., and the directors included Hon. R. H. Cochran, of Toledo, O., formerly President of the Wheeling Bridge & Terminal, and Earl W. Oglebay, of Cleveland, O., the remainder being Wheeling men. When the committee reported to the Chamber of Commerce, it was decided to go ahead at once to get the road into financial shape and to present its claims to Eastern capitalists. The city of Wheeling is expected to subscribe half a million dollars, and the county as much more. The estimated cost of the road is five million dollars. Terminals are already provided in Wheeling by the Wheeling Bridge Terminal Co.

York Southern.—The first train to run over the new standard gage tracks between York, Pa., and Delta, Md., a distance of 34 miles, was an eleven-car excursion train to York Fair last week. The company has not yet completed its equipment of new rolling stock, and chartered coaches belong to the Pennsylvania. It is possible that the company may purchase that portion of the Baltimore & Lehigh (narrow gage) extending from Delta to Belair, Md. The Baltimore & Lehigh runs from

Delta to Baltimore, 44 miles. It will either be changed to standard gage in the near future or operated by electricity. Through freight must now be transferred at Delta.

GENERAL RAILROAD NEWS.

Chicago, Peoria & St. Louis.—It is announced that the agreement for the transfer of this property to the St. Louis, Alton & Terre Haute, which seemed to have been finally settled, has been abandoned.

Little Rock & Memphis.—The sale of the road at foreclosure, which was to have occurred in Little Rock, Ark., this week, has been postponed until Oct. 25.

Marietta & North Georgia.—Judge Newman, of the United States Circuit Court at Atlanta, has issued a final decree for the sale of this road. The exact date for the sale has not been fixed, but it will be about Nov. 15. It will be remembered that when the property was offered at foreclosure some time before no bid was received at the minimum price fixed by the court. In the decree just issued Judge Newman fixed the minimum price for the Tennessee Division of the property at $245,000 and for the Georgia Division $390,000. The bridge and approaches over the Tennessee River must bring at least $40,000.

Norfolk & Western.—On application of attorneys representing the Mercantile Trust Company of Philadelphia, Judge Goff, in the United States Circuit Court for West Virginia, has issued an order foreclosing the 1889 mortgage which is a first mortgage on the West Virginia extension and the Norfolk terminal property.

Northern Pacific.—Two additional receivers have been added to the number already exercising authority in Northern Pacific matters. These are Edwin L. Bonner, of Missoula, Mont., and Captain J. H. Mills, of Deer Lodge, Mont., who were appointed by Judge Knowles, of the United States Circuit Court for Montana. Judge Knowles also confirmed the appointment of Andrew F. Burleigh as the third receiver, the latter being the receiver appointed by Judge Hanford, of Washington. He has also been confirmed by Judge Gilbert, of Oregon. Judge Lacombe, of New York City, at the postponed hearing before him this week, stated that he thought it well to further delay action on the resignations of Messrs. Oakes, Rouse and Payne, and the appointment of their successors in his jurisdiction. It was stated that the conflicting interests would make an effort to reach a mutual understanding, and that the differences existing between the Circuit Courts having jurisdiction might be adjusted. The adjournment before Judge Lacombe was asked by the Farmers' Loan & Trust Co., and the attorneys of the other interests represented agreed to this action. The Judge for the Idaho Circuit also failed to appoint new receivers for his circuit or to accept the resignations of Messrs. Oakes, Rouse and Payne at the hearing before him this week.

Oregon Railway & Navigation Co.—The proposed sale of the property under foreclosure by the Farmers' Loan & Trust Co. did not occur in Portland, Or., Oct. 14, as advertised. The attorneys for the Union Pacific stockholders filed a bond of $800,000, and secured a stay of proceedings pending an appeal to the Supreme Court of California. As the appeal cannot be reached until February, it is probable that the road may not be sold before another year.

Pennsboro & Harrisville.—The property of this company, owning a narrow gage road from a junction with the Parkersburg branch of the Baltimore & Ohio, at Pennsboro, W. Va., to the town of Harrisville, and to Ritchie, the county seat, is offered for sale. Practically all of the stock of the company was held by the former president, and his recent death is the reason for offering the property for sale now. The present line is about nine miles long, and a charter has been secured for an extension into timber and coal regions, and surveys have been made for this line. The capital stock is $10,000 and the bonds amount to $14,000.

Southern Pacific.—The following earnings are reported for August:

	1895.	1894.	Inc. or dec.	
Gross earn	$4,575,121	$4,592 910	D.	$17,789
Oper. exp	2,963,569	2,835 957	I.	127,612
Net earn	$1,611,552	$1,756,953	D.	$145.401
Net eight mos	9,705 692	9,277,099	I.	428,593
PACIFIC SYSTEM.				
Gross earn	$3,083,266	$3,126,997	D.	$43,731
Net earn	$1,244,169	$1,294,201	D.	$50,032
ATLANTIC SYSTEM.				
Gross earn	$1,053,472	$1,007,374	I.	$46,098
Net earn	$266,296	$313,129	D.	$46,833
AFFILIATED COMPANIES.				
Gross earn	$438,383	$458,540	D.	$20,157
Net earn	$101,087	$149,624	D.	$48,537

Union Pacific.—A new committee has been formed to undertake the reorganization of the company. The committee is as follows: Louis Fitzgerald, President of the Mercantile Trust Co., of New York; Jacob H. Schiff, of Kuhn, Loeb & Co.; Oliver Ames, 2d; T. Jefferson Coolidge, Jr.; Chauncey M Depew, President of the New York Central and Hudson River, and Marvin Hughitt, President of the Chicago & Northwestern.

An underwriting syndicate has been formed which will subscribe $10,000,000 to be used in paying the past due coupons on the underlying liens prior to the first mortgage and to pay the interest on these liens for the next two years. It is understood that the new plan will provide for a consolidated mortgage covering the Union Pacific and Kansas Pacific systems and an issue of preferred and common stock The Kansas Pacific consols are to receive 80 per cent. in new first mortgage bonds of the consolidated system and 70 per cent. in new preferred stock.

Union Pacific, Denver & Gulf.—Reports as to the physical condition of this property seem to prove that it is one of the few Western roads to come out of the hard times in a better physical condition than when the panic stopped all betterments. The property was never in better condition than now, and the roads under the management of Mr. Frank Trumbull, Receiver, enters the winter season well equipped for business. Every passenger coach has been overhauled and all the cabooses rebuilt. The Receiver has placed orders for 300 new freight cars. Six miles of new rails recently laid between Walsenburg and Trinidad completed the gap between the two towns, making a total of 33 miles of new track added during the year. Along the line 150 miles of new fencing has been built. In Pueblo a new bridge costing $18,000 has been constructed. New ties and new ballasting has made the roadbed better than it was previously known. Traffic has been encouraged at all non-competing points, though the Receiver has not entered into sharp competition at competing points. The passenger department has been materially improved under the new general passenger and ticket agent, and next year this road will be a lively competitor for the Colorado excursion and tourist travel.

Washington City & Point Lookout.—Charles A. Green and Herman Knubel, of New York, purchased this road at public auction at Hughesville, Md., Oct. 12, for $2,500. The sale was made to clear up title. The purchasers expect to commence active operations in the near future to complete the road to Point Lookout, its intended terminus. At present the road extends to Mechanicsville, in St. Mary's County.

Western Union Telegraph Co.—The annual report of the company for the year ended June 30 shows:

	1895.	1894.	Changes.	
Gross earn	$22,218,019	$21,852,655	I.	$365,364
Oper. exp	16,076,630	16,060,170	I.	16,460
Net earn	$6,141,389	$5,792,485	I.	$348 904
Interest and sink. fund.	933,813	931,607	I.	2,205
Balance	$5,207.576	$4,860.878	I.	$346,698
Dividends	4,767,734	4,740,063	I.	27,671
Surplus	$439.842	$12 .815	I.	$319 027
Previous surplus	7,007,634	6,886,819	I.	120,815
Total surplus	$7,447,476	$7,007.634	I.	$439,842

The report says that in the year there were constructed 817 miles of new pole line. The total length was reduced 589 miles, because of the transfer of the wires of sundry acquired highway lines to Western Union poles, by which an unnecessary duplication of pole lines was corrected and the expense of reconstruction and maintenance kept at a minimum. There were constructed 15,748 miles of new wire, but the total gain was only 11,859 miles. The difference is due to the abandoment of wires that were either worn out or of inferior gages. Over 10,000 miles of the new wire are of copper. The cost of construction of new property for the year was $574,639 and $16,000 was paid for patents. There was a decrease of 324,922 in the number of messages transmitted, the falling off being principally in press messages. The returns when analyzed show that the company transmitted about 600,000 more full rate messages than in the previous year. The average tolls received were 30.7 cents per message; the average cost was 23.3 cents. Following are comparisons of operations for the last four years:

	1895.	1894.	1893.	1892.
Mile poles and cables	183,714	193,313	189.936	189 576
Miles of wires	804.651	790,792	769 201	739,105
Offices	21,360	21.166	21,078	20,700
Messages	58,307,315	58,632.237	65,591,858	62,887,298
Average tolls	30.7c.	30.5c.	31 2c.	31.6c.
Average cost	23.3c.	23.3c.	22.7c.	22.3c.
Receipts	$22,718,019	$21 85 655	$24.978.143	$23.716,405
Expenses	16,076,630	16,060,170	17,482.406	16.307 857
Profits	6,141,389	5,791,485	7.495,037	7,398,548

TRAFFIC.

Traffic Notes.

During the past six months five large steamships have taken about two million feet each of lumber from Puget Sound to Delagoa Bay, South Africa.

The Railroad Commissioners of Texas have issued an order concerning the compression of cotton for shipment by railroad. Five additional rules are added to Section 3 of the cotton tariff of July 15. Cotton to be delivered at destination compressed must be compressed to a density of 22½ lbs. per cubic foot.

The New York Board of Trade & Transportation, at a meeting held last week, adopted resolutions asking Congress to repeal the prohibition of pooling; also that it was the sense of the Board that the claims of the Government against the Pacific railroads should be funded on a basis that the railroads can bear. Senator Cullom is reported as saying that he thinks the bill to repeal the pooling law will be taken up and passed at the next session of Congress.

The latest rate war is on passengers between Ogden and Salt Lake City, Utah, the fighters being the Rio Grande Western and the Union Pacific. At last accounts tickets could be had from brokers, if not of the regular officers, for 50 cents round trip between Salt Lake and Ogden, 75 cents between Salt Lake and Provo, and $1 to San Pete Valley and return. Trains are all heavily loaded and the Salt Lake theaters and restaurants are doing a rushing business.

Chicago Traffic Matters.

CHICAGO, Ill., Oct. 16, 1895.

The Southwestern, in fact, the entire Western freight situation, became so threatening last week that when the executive officers found that nothing could be accomplished at the meeting several decided to unite in a call for a private conference to discuss the situation. A full representation of Southwestern lines was secured and after a two days' session at the Union League Club it was voted to maintain all rates on and after Oct. 14 and to instruct Chairman Midgley to at once convene the traffic men and instruct them to advance all Missouri River freight rates to the tariff in effect prior to the recent reductions as soon as it can be done. At the same time, the Chairman of the Passenger Association was instructed to again convene the general passenger agents and proceed to the formation of a new passenger association. The Missouri, Kansas & Texas and the Missouri Pacific were represented at the meeting and voted with the other lines for a restoration of freight rates. The general impression is that the officers present mean what they say this time and that rates will be advanced as ordered. Whether they will remain "advanced" in practice as well as in the tariff remains to be seen.

The Colorado situation remains unsettled, and freight rates are in worse shape than last week. The open reductions by the Santa Fe did not reach the spot, and it was soon evident that rates were being secretly quoted lower than those made by that line. Subsequently the Union Pacific, in connection with the Wabash, published a tariff from St. Louis to Colorado common points naming 38 cents 5th class, 40½ cents A and B, and 38 cents C, D and E classes. These rates were promptly met from Chicago by the Burlington and the Santa Fe, followed by a still lower tariff (Oct. 14), naming rates of 30 cents for classes 5, A, B, C, D and E from Chicago; 25 cents from St. Louis, and 20 cents from Missouri River points, to Colorado common points. This last move has apparently had a sobering effect, for efforts are now being made to bring about a meeting of the executive officers of the Colorado lines, in the hope that an agreement may be reached. It is doubtful, however, if any restoration is accomplished soon as there is reason to believe that some of the lines have contracts out extending well toward Jan. 1.

Passenger rates in Western territory fluctuate from day to day, and the man who knows the ropes has no difficulty in securing tickets at a material reduction from tariff. For example, tariff rates to St. Paul are $11.50, but no one who is posted pays over $8.00. Meetings are being held and efforts put forth to remedy the trouble, but there is little likelihood of this being accomplished until a general association is formed.

The Northwestern is accused of having corralled the hard coal traffic to Omaha. Totals for August and September are offered in substantiation of the charge as follows:

	Tons.
Chicago & Northwestern	35,623
Chicago, Milwaukee & St. Paul	2,110
Chicago, Burlington & Quincy	1,964
Chicago, Rock Island & Pacific	1,016

Lake rates continue to advance, and all the tonnage in sight is chartered as soon as light. Vessels have been attracted by the advance, and present rates may drop somewhere before the close of navigation.

All the Chicago lines have arranged for fast trains to Atlanta during the Exposition. Considerable pressure has been brought to bear upon the Louisville & Nashville to accept through cars from its Northern connections, but so far without success.

The Chicago & Northwestern has inaugurated a carriage, cab and coupé service similar to that run by the Pennsylvania, and has opened an office in its station where cab tickets can be procured at legal rates of fare to all parts of the city. While there is very little complaint of extortion on the part of cabmen in this city, the average passenger will feel more secure in purchasing a ticket from an employee of the railroad, and the arrangement will undoubtedly at once become popular.

The Santa Fe gives notice that passes will not be honored on its new limited express train, nor will private cars be hauled on this train.

Eastbound all-rail shipments last week show a further increase, and the distribution of the traffic indicates that it was not all carried at tariff rates.

The shipments of eastbound freight, not including live stock from Chicago, by all the lines for the week ending Oct. 12, amounted to 88,398 tons against 79,908 tons during the preceding week, an increase of 8,490 tons, and against 47,388 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	Week to Oct. 12. Tons.	p. c.	Week to Oct. 5. Tons.	p. c.
Michigan Central	6 831	7.6	7,047	8 8
Wabash	10,105	11 5	9,395	11.7
Lake Shore & Mich. South.	13,288	15 0	10,453	13.1
Pitts., Ft. Wayne & Chicago	11,445	13 0	10,241	12 8
Pitts., Cin., Chi. & St. Louis.	9,358	10.6	7,8 9	9 8
Baltimore & Ohio	5,974	6.8	4,560	5 7
Chicago & Grand Trunk	8,005	9.0	10,730	13.4
New York, Chic. & St. Louis	7,6 7	8.5	5,3 2	6 6
Chicago & Erie	11 149	12.7	1..833	13.6
C., C., C. & St. Louis	4,616	5.3	3,508	4.5
Total	88,398	100.0	79,908	100.0

Of the above shipments 2,311 tons were flour, 48,484 tons grain and mill stuff, 12,527 tons cured meats, 10,874 tons dressed beef, 1,673 tons butter, 1,179 tons hides, and 6,049 tons lumber. The three Vanderbilt lines carried 31.1 per cent.; the two Pennsylvania lines 23 1 per cent.

Receipts of Lumber at Chicago.

The figures shown below give the amounts of lumber received in Chicago over the several railroads named, the total receipts by months, and the grand total for the nine months named:

RAIL RECEIPTS OF LUMBER BY MONTHS.

	M. ft.
January	30 481
February	34,6'6
March	54,996
April	49,568
May	42,888
June	51.559
July	40 284
August	52 597
September	43,832
Total	400,861

RECEIPTS OF LUMBER BY ROADS.

	M. ft.
Chicago & Erie	10,361
New York, Chicago & St. Louis	11.071
Chicago & Grand Trunk	2,835
Baltimore & Ohio	386
Pennsylvania Lines	34,671
Pittsburgh, Ft. Wayne & Chicago	2,014
Lake Shore & Michigan Southern	5,892
Michigan Central	9,130
Louisville, New Albany & Chicago	19,553
C., C., C. & St. L	3 693
Wisconsin Central	16.325
Atchison, Topeka & Santa Fe	329
Chicago Great Western	1,1 0
Wabash	10,693
Chicago, Milwaukee & St. Paul	25 092
Chicago & Eastern Illinois	35,893
Chicago & Alton	8.987
Chicago, Burlington & Quincy	16.2 5
Illinois Central	104,789
Chicago & North Western	79,047
Total	400,861

The remotest parts of the country, with the exception of the extreme east, and the south Atlantic seaboard, are tributary to this market. A considerable percentage of the mahogany and other tropical woods handled here arrive from Atlantic ports. The recent rapid growth of the southern pine, cypress and hardwood trades is accountable for the striking exhibit made by roads reaching southward from the Ohio River. The Illinois Central brought something over 104,000,000 ft. A large part of this was yellow pine, though considerable hardwood and nearly all the cypress arrives by that line. The Chicago & Northwestern (79,047,000 ft.) extends to Marinette, Menominee, and through the upper peninsula, as well as to Ashland, Wis. It penetrates the pine, hardwood and cedar regions of upper Michigan and eastern and upper Wisconsin, touching Lake Superior at several points. Probably receipts hereafter will be less in comparison than during the first nine months of the year, though they are liable to mount to nearly the one hundred million mark. The total of receipts in this market in 1894 was 1,522,850,000 ft. Thus we see that rail receipts have come to be about one-third of the annual total. Since lake arrivals have fallen off one-fourth since 1892, and rail receipts are likely to increase with the passage of years, we can look forward to the time, not far in the future, when one-half of the lumber reaching this market will arrive by rail.—*Northwestern Lumberman.*